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### STUDIES ON THE VALUE OF X-RAY THERAPY IN EXPERIMENTAL GAS GANGRENE INFECTION.

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CLINICAL observations and experimental studies indicate the value both of antitoxin and of sulphanilamide in gas gangrene infections.

Recently, there has been considerable controversy concerning the value of X-ray therapy in gas gangrene infections. Unfortunately, for reasons which will be mentioned later, it is difficult from the clinical standpoint to evaluate this form of therapy. Furthermore, little experimental evidence is available. In view of this, and since the question is of extreme importance, it was decided to carry out some laboratory investigations.

#### Methods.

The experiments were carried out on groups of six mice which were infected intramuscularly in the thigh. Two groups of tests were arranged, one in which irradiation was the only treatment and the other in which X-ray treatment was combined with local application of sulphanilamide powder according to the technique of McIntosh and Selbie.<sup>(1)</sup>

The infecting dose and the amount of sulphanilamide were so adjusted that the infecting dose alone would kill all the mice within twenty-four hours, whilst the same amount injected with sulphanilamide killed only some of the animals.

For irradiation the mice were fixed on a specially designed circular sheet of lead which was 5.5 millimetres thick. One hind leg was drawn through a hole and fastened to the reverse side of the disk. Fixation of the mice was secure, but did not cause trauma. After the leg was placed on the lead disk, the infecting dose was

given into the exposed part and X-ray treatment was initiated.

Single or multiple doses of X rays were used, the other conditions being the following: focal distance 40 centimetres, 140 kilovolts, 4.0 milliamperes, 0.5 millimetre of copper filter. The lengths of exposure were nine and eighteen minutes.

#### Results.

In Table I the results of experiments with combined X ray and sulphanilamide therapy are shown.

Finally, some experiments were performed in which the only treatment was with X rays. Mice were infected with 0.02 cubic centimetre of *Clostridium welchii* culture or 0.15 cubic centimetre of *Vibrio septique* culture. The results are shown in Table II.

#### Discussion.

From these results it is clear that, with the technique employed, the survival of mice infected with either *Clostridium welchii* or *Vibrio septique* could not be prolonged. This negative result was obtained in both series of experiments. Neither the mice infected with culture alone nor the ones infected with a mixture of culture and sulphanilamide benefited by X-ray treatment.

In view of these results, it is difficult to understand why certain clinicians report enthusiastically on X-ray therapy in the prevention and treatment of gas gangrene in humans. The experimental results obtained here agree with the clinical experiences of Caldwell,<sup>(2)</sup> who absolutely condemns X-ray treatment.

It is, of course, impossible to evaluate the clinical reports without intimate knowledge of both the clinical and the bacteriological findings; but some points in the diagnosis and treatment of gas gangrene which are frequently not taken into consideration are, perhaps, worth mentioning.

Firstly, all gas gangrene organisms are ubiquitous, especially *Clostridium welchii*, which occurs as a normal

TABLE I.

Effect of 2.5 Milligrammes of Sulphanilamide Combined with X-rays on Infection with 0.65 Cubic Centimetre of *Clostridium welchii* Culture or with 0.03 Cubic Centimetre of *Vibrio septique*.

Organism.	Fate of Animals.			Remarks.
	X-ray Dosage.		Controls with Sulphanilamide.	
	50r.	100r.		
<i>Clostridium welchii</i> I .. ..	1 dead in 24 hours. 3 dead in 48 hours. 2 survived.	1 dead in 24 hours. 1 dead in 48 hours. 1 dead in 96 hours. 3 survived.	2 dead in 24 hours. 1 dead in 48 hours. 1 dead in 96 hours. 2 survived.	Single exposure to 50 and 100r.
<i>Clostridium welchii</i> II .. ..	1 dead in 24 hours. 5 survived.	2 dead in 24 hours. 4 survived.	2 dead in 24 hours. 4 survived.	Two exposures 30 minutes and five hours after infection.
<i>Clostridium welchii</i> III .. ..	3 dead in 24 hours. 3 survived.	2 dead in 24 hours. 4 survived.	3 dead in 24 hours. 3 survived.	Two exposures 30 minutes and five hours after infection.
<i>Vibrium septique</i> IV .. ..	1 dead in 24 hours. 3 dead in 48 hours. 2 survived.	4 dead in 48 hours. 2 survived.	4 dead in 48 hours. 1 dead in 96 hours. 1 survived.	Single exposure to 50 and 100r.
<i>Vibrium septique</i> V .. ..	1 dead in 24 hours. 2 dead in 48 hours. 3 survived.	4 dead in 48 hours. 2 survived.	1 dead in 24 hours. 2 dead in 48 hours. 1 dead in 72 hours. 2 survived.	Two exposures 30 minutes and five hours after infection.

TABLE II.

Organism.	Fate of Animal.			Remarks.
	X-ray Dosage.		Controls.	
	50r.	100r.		
<i>Clostridium welchii</i> .. .. .	4 dead in 24 hours. 2 survived.	4 dead in 24 hours. 1 dead in 48 hours. 1 survived.	3 dead in 24 hours. 1 dead in 48 hours. 2 survived.	Two exposures to X-rays, one 30 minutes and one five hours after infection.
<i>Vibrio septique</i> .. .. .	2 dead in 24 hours. 1 dead in 48 hours. 3 survived.	1 dead in 24 hours. 2 dead in 48 hours. 1 dead in 96 hours. 2 survived.	2 dead in 24 hours. 1 dead in 72 hours. 1 dead in 96 hours. 2 survived.	

saprophyte in the intestines, the mucous membranes and in a great number of cases on the skin of normal people.<sup>(10) (11) (12)</sup> Therefore, the demonstration of *Clostridium welchii* in wounds and wound secretions is absolutely devoid of diagnostic value, and its presence should not be mistaken for the presence or imminence of gas gangrene. Recently Butler,<sup>(13)</sup> in extensive researches on the bacteriological findings in lochial secretions, has again emphasized this fact, and has drawn attention to the importance of capsulation for assessment of virulence. Actually *Clostridium welchii* can be found almost regularly in chronic ulcerations of the skin, between the toes, in the groin, and in other places where decomposition of sweat and other secretions occurs. Furthermore, it can be demonstrated in clean wounds, which heal by first intention.<sup>(14) (15)</sup>

Secondly, gas gangrene is rarely a primary wound infection, since some other low-grade infection usually precedes its development. Even so, gas gangrene caused by one of the anaerobic organisms only is unusual. As a rule several pathogenic and also apathogenic anaerobes together with aerobes participate in the infection. This fact constitutes one of the fundamental differences between the clinical entity "gas gangrene" and experimental gas gangrene infections with pure cultures of high virulence.

The two points mentioned make it clear that misconceptions of the action of a therapeutic procedure can arise in various ways. Suppurating or clean wounds, in which *Clostridium welchii* or some other anaerobic bacillus can be demonstrated, apparently respond satisfactorily to treatment. Actually, the gas gangrene organisms were present only as saprophytes and the wound would have healed without therapeutic interference.

Further, wounds harbouring a mixed flora of low virulence, of which gas gangrene organisms form a part, actually might respond well to X-ray treatment. This result would be in accord with experiences with other types of infection. A beneficial effect of X-ray treatment is mainly observed in low-grade, localized infections, whilst highly virulent infections are rarely influenced. Therefore, it seems likely that similar conditions must be considered in the treatment of anaerobic infection, the true gas gangrene being resistant to X rays, whilst the low-grade infections which precede the gas gangrene or an anaerobic infection of low virulence will be amenable to treatment. In other cases the development of gas gangrene would be prevented by treatment of the preceding or accompanying infection.

Sulphanilamide and antitoxic serum, on the other hand, act favourably on the virulent type of gas gangrene infection which is comparable to the experimental infection; but even in these circumstances it seems as if some of the fundamental facts concerning chemotherapy or serum therapy are sometimes not considered in the clinical evaluation of this type of treatment. Serum therapy acts only on the toxæmia whilst the bacilli are uninfluenced. Sulphanilamide, however, has just the opposite effect: the bacilli are killed or their multiplication is prevented, whilst the drug has no influence whatsoever on the toxin.

Twenty-four years ago Weinberg and Seguin in their classical monograph<sup>(16)</sup> clearly distinguished the hyper-toxic form of gas gangrene from the "classical" form, and thus occasional failures of standardized treatment with sulphanilamide or with antitoxic serum are likely to occur when the characteristics of the individual case are not taken into consideration. Sulphanilamide treatment will obviously be without effect in the toxic cases, whilst serum

treatment will be ineffectual in the spreading truly gangrenous forms.

Another vexed point is the question of local or peroral treatment with sulphanilamide. All experimental evidence favours local treatment, because it is effectual with smaller doses of the chemotherapeutic substance; only small amounts of the drug are absorbed and the disagreeable and sometimes dangerous after-effects of sulphanilamide treatment are avoided.<sup>(11)</sup>

It must be remembered, however, that the diffusion of the sulphonamides is slow and that blood clots and dead tissue are not readily penetrated. Local sulphanilamide treatment would, therefore, have more a prophylactic than a true therapeutic action. Furthermore, the penetrative power of the drugs of the sulphanilamide class varies considerably, the most highly active substances being the least diffusible. In view of this, local treatment of fully developed gas gangrene in which the bacilli are widely dispersed would be ineffectual.

It is obvious that when local sulphanilamide treatment is attempted, only the pure crystalline substances or some form especially suited for local application should be employed. The use of crushed tablets contradicts all surgical principles, because a large part of the tablets consists of inert matter, and the placing of crushed tablets in a wound after surgical débridement constitutes nothing less than an artificial introduction of foreign bodies into an area from which they were just removed.

#### Summary.

The X-ray treatment of mice infected intramuscularly with either *Clostridium welchii* or *Vibrio septique* was ineffectual.

#### Acknowledgement.

I am greatly indebted to Dr. Stephens for advice, and to Mr. Walsh, of the X-ray Department, Alfred Hospital, for carrying out the irradiation.

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## Reports of Cases.

### A CASE OF CEREBRAL ABSCESES.<sup>1</sup>

By T. Y. NELSON,

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THE following is a description of a case of multiple cerebral abscesses in which the main interest concerned the question

<sup>1</sup> This case was discussed at a clinical meeting held at Number 6 Australian General Hospital, Middle East, on December 21, 1941.

of aetiology. The usual classification of cerebral abscesses is into two groups, known as "adjacent" and "metastatic", according to the site of the original focus of infection. The first group includes the large class which follows mastoid infection and the cases (commonly occurring in times of war) which are due to infection of the brain from indriven bone fragments and metallic foreign bodies. Those in the metastatic group are almost invariably caused by pulmonary suppuration, usually bronchiectasis, but are occasionally due to empyema. If this classification is accepted, it is difficult to be certain in which group the case under discussion should be included.

#### Clinical Record.

The patient, a hospital orderly, aged thirty-five years, had been in good health until about one week before his admission to hospital early in November, 1941, when he had suffered from a "turn", which was evidently an epileptic fit, preceded by a sensation of tingling in the little finger of the right hand. He lost consciousness, but recovered soon after his admission to a camp reception station, and on the following day he was considered well enough to be discharged to his unit, which was expected to move shortly. Two days later, on November 12, 1941, whilst travelling in an omnibus, he felt ill, vomited and had another seizure. He was admitted to Number 6 Australian General Hospital with evidence of an acute illness characterized by fever and vomiting and especially by mental confusion and drowsiness. He was lethargic, but could be roused sufficiently to answer questions with difficulty. There was evidence of involvement of the right pyramidal tract. Babinski's sign was present in the right foot, and the right arm and leg showed loss of power. There were some scabbed abrasions on his left knee and the right upper central incisor tooth was loose. There was no sign of any scalp or skull injury. Lumbar puncture was then performed. The cerebro-spinal fluid did not appear to be under increased pressure, although manometric readings were not taken. Examination of the fluid showed that there were 115 cells per cubic millimetre, the majority being lymphocytes, and that the protein content was raised (70 milligrammes per centum). Major J. Kingsley, the ophthalmologist to the hospital, examined the optic disks and reported some inflammatory changes at the left macula. The provisional diagnosis was encephalitis.

On the following day the patient's condition was worse. He was aphasic and right hemiplegia was fully established. Lumbar puncture was again performed; the cells in the fluid now numbered 289 per cubic millimetre (lymphocytes and mononuclear cells) and the protein content was 90 milligrammes per centum. Although tuberculous meningitis and cerebral tumour had to be considered in the differential diagnosis, a further possibility was raised when inquiry into his previous history revealed the fact that ten days before his first epileptic attack he had suffered a head injury while on leave in Cairo. The details of this were not known, but he had apparently been unconscious for some hours. Consideration of such sequelae of head injury as subdural hematoma and *Spätapoplexie* thus arose. It was still believed that the diagnosis of encephalitis was the most justifiable, even if its cause could not be more exactly determined. X-ray examination of the skull and of the chest revealed no abnormality.

The soldier's condition continued to deteriorate, and by November 19, 1941, he was semi-comatose and could scarcely be roused. He was incontinent of urine and had a pronounced right-sided hemiplegia with spasticity of the affected arm and leg. Further examinations revealed some swelling of the left optic disk; the leucocytes in his blood numbered 18,000 per cubic millimetre, 86% being neutrophilic cells. The third lumbar puncture indicated improvement, in that the cells now numbered only 66 per cubic millimetre, while the protein content had fallen to 60 milligrammes per centum.

After consultation with Colonel R. A. Money it was considered that a deep-seated abscess could not be excluded and that exploration was indicated in view of the subsiding meningeal reaction. It was fully realized that even if an abscess were present it would not be satisfactorily encapsulated at this stage; but the patient's condition was so rapidly deteriorating that it was decided to make a burr hole over the left motor area for the hand. The operation was performed under local anaesthesia on November 20, 1941. Explorations were made with a "brain needle" in several directions and no abnormality was encountered until finally the left lateral ventricle was tapped, the fluid being under increased pressure. About ten cubic centimetres of clear cerebro-spinal fluid were allowed to drain away. At a final exploratory puncture the needle entered, at a depth of about three centimetres, an area devoid of a capsule, from which foul-smelling brownish pus and blood drained. The needle was left *in situ*, protected by a "doughnut" dressing. There was an immediate improvement in the patient's condition, and by the next day, having survived a severe



reaction, he was conscious, voided urine normally, and had some movement of the right hand and leg. Examination of the pus revealed both Gram-positive and Gram-negative bacilli, the latter resembling *Bacillus coli communis*, together with cocci; but no organisms were grown in culture.

For the next three weeks small amounts of foul-smelling brownish pus continued to drain through the needle, and soon the patient manifested movement of the right arm and leg, complete understanding of speech and ability to say a few words in a whisper. The number of leucocytes in the blood fell to 13,000 per cubic millimetre after the operation and then fluctuated between 7,000 and 10,000. After a time, however, it became evident that the abscess was not draining satisfactorily, as the intracranial pressure was rising. A second burr hole was made more posteriorly and inferiorly in the temporal region, the dura being sealed off by diathermy coagulation. Three days later the dura was opened and a thick capsule was felt one centimetre below the surface. This was penetrated by means of the "brain needle", and about ten cubic centimetres of thick, yellow, odourless pus were evacuated, containing short-chained streptococci revealed on immediate smear. The cavity appeared to be a completely encapsulated abscess without communication with the original lesion. The patient's condition again improved somewhat and his headache was relieved, but he was still very ill. It was thought that the second abscess had been completely drained, and as it was well encapsulated, that it should give rise to no further symptoms. It was unlikely, however, that the original condition had entirely subsided, and the most reasonable explanation of its occurrence seemed to be that there had been a thrombosis with subsequent softening and infection.

The subsequent history of this patient is of additional interest. The improvement that had occurred in his condition after the second operation was only temporary, and his intracranial pressure remained high, despite some further drainage from the original abscess. On December 23, 1941, his headache and vomiting were dramatically relieved by the development of a large *hernia cerebri* at the site of the original burr hole. This indicated the onset of a spreading cerebritis, and despite attempts to control the infection with sulphonamide and the increasing pressure by a series of lumbar punctures, another hernia appeared at the site of the second burr hole. Complete right-sided hemiplegia and aphasia reappeared, followed by coma and a high temperature. Death took place on December 27, 1941.

#### Post-Mortem Examination.

A full post-mortem examination was carried out by the pathologist to the hospital, Major E. B. Jones. He noted that on inspection of the scalp two cerebral herniae could be seen projecting from the operation sites on the left

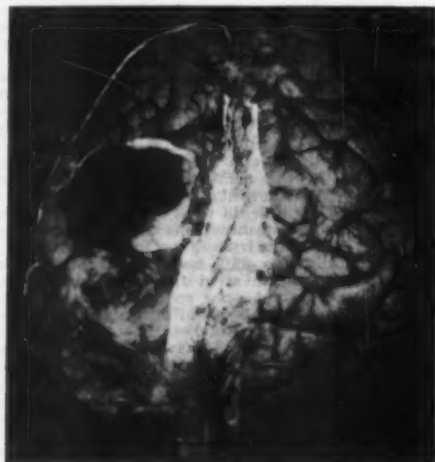


FIGURE I.

Upper surface of brain, showing the two cerebral herniae at the sites of operation and the areas of depressed cortex posteriorly and inferiorly previously occupied by the subdural collections of pus.

side of the head. The larger one measured approximately four centimetres in diameter and contained some blood clots. It was situated three centimetres from the medial line over the Rolandic area. The smaller hernia was approximately two centimetres in diameter and was situated

postero-laterally to the larger one. After removal of the calvarium so as to leave the herniae intact, pus was found to be present under the *dura mater*. It lay between the two cerebral herniae and tracked posteriorly over the lateral



FIGURE II.

First horizontal section at depth of five centimetres, showing several smooth-walled cysts and a ragged secondary abscess cavity, previously filled with yellow pus, in the left cerebral hemisphere. The tremendous increase in the size of this hemisphere can also be seen. The left lateral ventricle has been compressed and displaced inferiorly so that it does not appear in the section. The area of cortex stained yellow from old contusion is marked X.

surface of the parietal lobe and down over the temporal lobe. The cortex in these regions was considerably depressed. The left cerebral hemisphere was much larger than the right, and the motor gyrus was swollen to almost three times its normal size (Figure I).

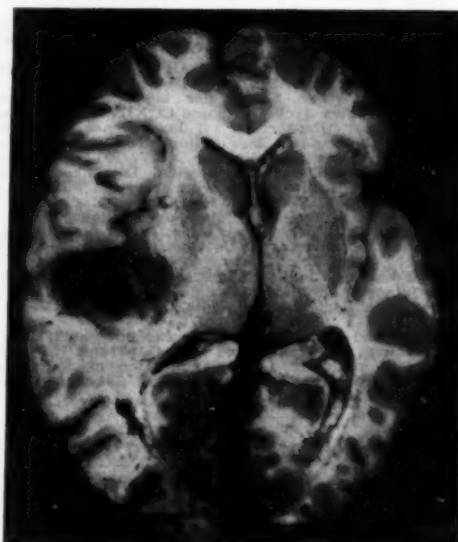


FIGURE III.

Second horizontal section at depth of eight centimetres, showing the primary abscess cavity, filled with dark brown blood and pus, deep in the left cerebral hemisphere. Two large thrombosed arteries can just be discerned, crossing the cavity, after dissection. Some uninfected cysts can also be seen.

The brain was removed intact and placed in hardening fluid for a week. Then two horizontal sections were made through it at a depth of five and eight centimetres respec-

tively from the upper surface. The first of these revealed two abscess cavities filled with thick yellow pus in the substance of the hemisphere and three cysts, varying in diameter from two centimetres to half a centimetre, filled with clear fluid (Figure II). The whole of the surrounding brain tissue was considerably softened. At the level of the second section a larger, irregular abscess cavity was found lateral to the posterior portion of the internal capsule (Figure III). It contained brownish blood-stained pus, and the swollen, oedematous cerebral tissue around it had a yellowish tint, presumably due to diffusion of altered blood. The lateral ventricle was compressed and pushed over towards the right side.

When the pus and debris were later washed out of this larger abscess cavity it was found to be traversed by two large cerebral vessels, each of which contained an organized thrombus in its lumen. Careful dissection did not reveal the presence of any aneurysmal dilatation or rupture.

No particular pathological changes were found in the thoracic or abdominal cavities or viscera.

Microscopic examination was made of the tissues from the herniated cerebral substance, from portion of the cerebral cortex (which was discoloured by old hæmorrhage), from portion of the wall of one of the larger cysts, and from portion of the wall of the deepest abscess cavity. These sections all showed evidence of acute inflammation with thrombosis of blood vessels. In the cortical tissue *Gitterzellen* were conspicuous, as were lipid-laden cells. There was evidence of an intense cerebritis as well. In one large vessel thrombosis with organization had occurred. The wall of the abscess cavity showed little attempt at organization and contained abundant pus cells. Adjacent to it the cerebral tissue was oedematous and showed evidence of inflammatory cellular infiltration. In the deeper portions of the tissue away from the abscess cavity perivascular cuffing, due mainly to round-cell infiltration, was conspicuous. In the tissue removed from the cyst wall no lining membrane could be seen. Some inflammatory changes were present here also.

The pathological diagnosis was thus considered to be (i) porencephaly, (ii) cerebral thrombosis, (iii) cerebral softening and hæmorrhage, and (iv) cerebral abscess and infected cerebral cysts.

#### A CASE OF CEREBRAL ABSCESS DUE TO PULMONARY SUPPURATION.<sup>1</sup>

By R. A. MONEY, M.C., E.D., F.R.C.S. (England),  
Colonel, Australian Army Medical Corps, Abroad.

The following case of abscess in the right occipital lobe of the brain presents several interesting and unusual features.

##### Clinical Record.

The patient, a driver in the Royal Army Service Corps, aged thirty-two years, had been quite well till a year earlier, when he noticed that he became easily fatigued. About the same time he developed a cough with morning sputum. There was no family history of tuberculosis or other illness relevant to the case; the only previous illness to which he would admit was pneumonia in childhood. Upon arrival in the Middle East in April, 1941, he complained of palpitation of the heart and dyspnoea on exertion, and then he commenced to sweat heavily at night. Towards the end of July, 1941, he had a sudden "dizzy turn" and almost fell into a pool of water. He was unconscious for approximately three minutes. The attack was witnessed by a medical orderly, a corporal, who observed the following events in sequence: (i) opening of the mouth widely, as in yawning; (ii) copious salivation; (iii) stiffness of the whole body, with some cyanosis; and (iv) some minor spasmodic movements of the limbs.

Taken to a light field ambulance, he was admitted with a diagnosis of *grand mal*. When examined about thirty minutes after the "turn" he was found to be drowsy. Both pupils were dilated. The knee jerk on the right side was exaggerated, and the right plantar reflex was extensor in type. His temperature was 99° F. It was learnt that during his previous twenty-one months in the army he had had five somewhat similar "turns", but this information was unfortunately not recorded on his main history sheet and was only subsequently discovered on an old field medical card.

<sup>1</sup> This case was discussed at a clinical meeting held at Number 6 Australian General Hospital, Middle East, on December 21, 1941.

He was kept for observation in the field ambulance and transferred to a general hospital later in the day. By the time he reached the hospital the abnormal neurological findings had disappeared, but he looked somewhat pale. He had an evening rise of temperature up to 100° F. Examination of his chest revealed dulness and some râles over the upper lobe of the right lung. An X-ray film of the lungs was reported upon as showing "consolidation and cavitation in the right upper lobe, almost certainly due to tuberculosis" (Figure 1). Examination of his sputum on several occasions revealed no *Mycobacterium tuberculosis*, although purulent sputum and one hæmoptysis were noted. There was no clubbing of his fingers. The sedimentation rate of his blood was 48 millimetres in the first hour. The Kline test produced no reaction.

Shortly after his admission to hospital he began to complain of occipital headache of increasing severity and frequency. A lumbar puncture was performed early in September, 1941. The pressure was not recorded, but the cerebro-spinal fluid had no increase in cells and only a slight increase in protein.

He was transferred to another general hospital, which had special facilities for the care of tuberculous patients. This hospital was taken over by Number 6 Australian General Hospital early in October, 1941. His chest condition then appeared to be stationary and gave no cause for alarm, but he still complained of headache.

Early in November, 1941, and about a week before his death, the headache became much more severe. Always in the occipital region, it was more or less continuous and was accompanied by a certain amount of mental aberration at night. A careful neurological examination failed to reveal any abnormal signs. No papilloedema was observed, and the fields of vision were roughly full to confrontation.

On the night of November 6 to 7, 1941, his mental condition became very strange, and he persisted in getting out of bed and walking about. Early next morning he took a "fit" with violent extensor spasms, which lasted for a few moments. Thereafter he had incontinence of urine, and a transient grasping reflex was elicited in the right hand. Later in the morning his mental condition was wandering and he appeared to be "beside himself" with pain. Irregular spasmodic twitchings of the limbs and considerable yawning were noted. Early papilloedema with fullness of the vessels was seen in the right fundus. In the left the optic cup had disappeared and the vessels were full.

On the afternoon of November 7, while preparations were being made for a lumbar puncture under local anaesthesia, he became completely unconscious and exhibited a typical extensor "cerebellar" type of seizure, which lasted from five to ten minutes and was accompanied by minor twitchings of the limbs. Both sides were equally affected. The tendon reflexes were exaggerated, and Babinski's sign was present on both sides. About ten minutes later he became fully conscious and all the abnormal signs mentioned above disappeared. Lumbar puncture was then performed, but the pressure of the cerebro-spinal fluid was so low that it could not be registered and only a few drops could be obtained. The fluid contained no cells and its protein content was within normal limits.

It was assumed that he had a tuberculoma of the brain stem, probably located in the posterior fossa, and that the scarcity of the cerebro-spinal fluid and its low pressure in the lumbar region were due to blockage of the *foramen magnum* by a pressure cone of the cerebellar tonsils. The foot of the bed was raised and the patient was kept with his head low. After this his condition seemed somewhat better, though frequent yawning continued, and his pulse rate remained slow at about 60 beats per minute. Early on the morning of November 8 another series of "extensor" seizures took place. His pulse became rapid and weak and Cheyne-Stokes respiration made its appearance. He died a few hours later.

##### Post-Mortem Examination.

A full post-mortem examination was carried out by Major E. B. Jones, pathologist to the hospital. Major Jones found on opening the thoracic cavity that the right lung was adherent to the parietal pleura on the lateral aspect of its upper lobe, in the centre of which was a small cavity, approximately 1.5 centimetres in diameter, full of purulent material. Adjacent to the cavity the lung showed some consolidation interspersed with other smaller cavities. No structural changes were obvious in the remainder of the lungs, but some hypostatic congestion was present along the vertebral margins.

When the cranial cavity was opened the cerebral hemispheres were noted to be extremely anæmic and the gyri and sulci flattened. The right hemisphere was much larger than the left. The brain was adherent to the base of the skull in the region of the pole of the left temporal lobe and along the lateral margins of the *tentorium cerebelli*.

of both sides. Some adhesions were visible in the sub-arachnoid space around the base; very little cerebro-spinal fluid could be seen here.

The posterior part of the *gyrus cinguli* and the splenium of the *corpus callosum* had herniated through the *incisura tentorii*, and both cerebellar tonsils had been forced into the *foramen magnum*. The brain was removed and placed in a hardening fluid. At the time of autopsy death was believed to be due to a condition of acute internal hydrocephalus associated with chronic adhesive meningitis, and it was assumed that the meningeal infection was tuberculous.

A week later, however, the brain was cut and a large abscess situated deeply in the right occipital lobe was revealed (Figure II). The cavity was approximately 4.0 centimetres in diameter and contained thick greenish-yellow pus within a definite capsule. The abscess had evidently formed on the medial side of the posterior horn, which was displaced laterally, and it must have been present for a considerable time. No *Mycobacterium tuberculosis* was found in this pus; and subsequent histological examination of sections of the diseased lung, of the wall of the abscess, and of some doubtful tubercles around the base of the brain also failed to reveal any evidence of tuberculosis. The final diagnosis was therefore pulmonary suppuration (abscess formation) and bronchiectasis with metastatic abscess of the brain.

#### Comment.

1. At first sight it seemed extremely difficult to understand why this patient had not a definite left-sided hemianopia. Closer inspection, however, of the site of origin of the abscess showed that it was situated on the medial side of the posterior horn of the right lateral ventricle and anterior to the calcarine fissure and neighbouring area which subserve the function of vision. The optic radiations pass from the lateral geniculate body and the pulvinar of the thalamus into the posterior portion of the internal capsule, and then postero-laterally around the lateral wall of the posterior horn of the ventricle, to end in the calcarine area on both sides of the calcarine fissure and in the occipital pole. The arrangement of these fibres can be seen in Figure III. An abscess so chronic as this, growing

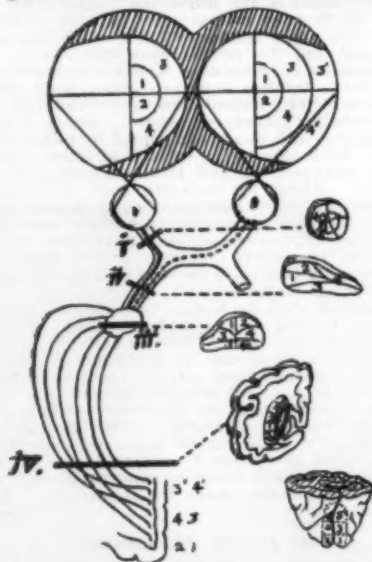


FIGURE III.

The visual system. The numerals illustrate the position in the visual pathways of the fibres mediating vision in various parts of the visual fields. At the level of section IV it will be noted that the optic radiations are in close proximity to the lateral wall of the posterior horn of the lateral ventricle. (From "Diseases of the Nervous System", by F. R. Ford.)

so slowly and with such a well-defined capsule, would not necessarily destroy these radiations, although some interference with their function might be expected as the effect of pressure. Unfortunately no estimation of the visual fields was carried out upon a Bjerrum's screen, although one was available at this hospital. By the time the presence of an intracranial "tumour" was suspected, the patient was too ill and non-cooperative to undergo this

investigation. It is felt, however, that by this method at least a qualitative, if not a quantitative, defect would have been found in the contralateral visual fields.

2. This case demonstrates another important point—that is, the difficulty of making a diagnosis of pulmonary tuberculosis from a report on an X-ray film alone. The sputum examinations in this case gave repeatedly negative results, and during the latter portion of his stay in hospital the patient had no pyrexia. On the other hand, there was no history of a previous illness which could account for the presence of the lung abscess and the surrounding bronchiectatic condition in the upper lobe of the right lung. Furthermore, at the post-mortem examination the lesion in the lung itself was considered on macroscopic appearances to be due to pulmonary tuberculosis, and this diagnosis was abandoned only after a thorough examination of the microscopic specimens from both the lung and the brain had failed to reveal any *Mycobacterium tuberculosis*.

3. Tuberculoma of the cerebral hemispheres is a rare condition, and for that reason it was considered that, if a tuberculoma were the cause of the headache and the intracranial condition, then it was more likely to be in the cerebellum or brain stem. Support to this theory was given by the nature of the seizures, which were of the extensor "decerebrate rigidity" type. Hence it was felt that surgical interference was out of the question. Had, however, routine ventriculography via the posterior horns been attempted, the abscess would certainly have been found and entered, although its distance from the surface would have made cure problematical.

4. The real cause for the extensor decerebrate type of seizure was also found at autopsy. Portion of the brain forming the medial wall of the abscess and the posterior end of the *corpus callosum* had herniated through the *incisura tentorii* and was compressing the brain stem in the vicinity of the superior colliculi. This caused a physiological block at this level and produced the typical condition of decerebrate rigidity which results from transection of the brain stem just above the red nucleus. An excellent illustration of a specimen showing a similar herniation is shown in Bailey's "Intracranial Tumours".<sup>13</sup> A modification of this illustration to conform with this case is produced (Figure IV).

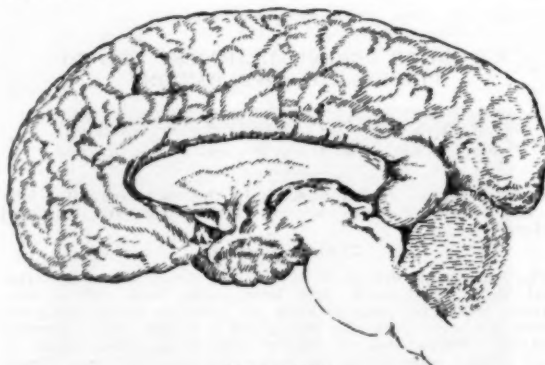


FIGURE IV.

Drawing of medial aspect of a right cerebral hemisphere, showing herniation of inner surface of right occipital lobe through *incisura tentorii*. (After P. Bailey, "Intracranial Tumours", Figure 374.)

5. The reason for the frequency of cerebral metastases from lung suppuration and pulmonary newgrowths has always been rather obscure. Some light has been thrown upon this subject recently by the work of Batson.<sup>14</sup> In experiments on living *Macacus rhesus*, by injection of colloidal thorium dioxide into the dorsal vein of the penis and observation of its passage upwards under the fluoroscopic screen, the injected material was seen to pass into the pelvic veins and thence into the inferior vena cava. When the abdomen was compressed some of the "Thorotrast" entered the lumbar spinal veins and could be followed past the area of compression into the thoracic spinal and intercostal veins. Thus in the acts of coughing, straining and other forms of muscular effort which raise the intra-abdominal pressure, blood (and with it emboli or metastases) may be squeezed into the spinal veins. In experiments on the human cadaver with injections of a dilute solution of vermilion, this radio-opaque dye was seen to spread through the prostatic and sacral venous plexuses and the lumbar spinal veins. Thence, without entering the caval system at all, it progressed up the spinal canal to the base of the



skull; whilst, if the injection were made into a breast vein, it was found to reach even as high as the transverse and superior longitudinal sinuses. Batson therefore postulated the existence of a large intercommunicating system of veins, of which the spinal and vertebral veins are the main channels. These veins lack effective valves and are the site of frequent reversals of flow, especially when the intra-abdominal and intrathoracic pressures are increased. In conditions in which frequent bouts of coughing and straining occur, they act as a storage lake as well as a drainage system, and may provide a ready vehicle for neoplastic and pyogenic metastases.

#### References.

- ① P. Bailey: "Intracranial Tumours", 1933.  
 ② O. V. Batson: "The Function of the Vertebral Veins and their Role in the Spread of Metastases", *Annals of Surgery*, Volume CXII, July, 1940, page 138.

### ACTINOMYCOSIS OF THE LUNG.<sup>1</sup>

By M. T. COCKBURN,  
 Major, Australian Army Medical Corps,  
 Abroad.

ACTINOMYCOSIS of the lung is seldom seen even in civil practice. The following case of a soldier treated in the Sixth Australian General Hospital merits recording, not only for its rarity, but also for the difficulty it presented in diagnosis.

#### Clinical Record.

The patient was a Polish officer, aged forty-one years, who could not speak English and whose history therefore could be obtained only with difficulty. He had been admitted to a British hospital on July 23, 1941, complaining of malaise and of a dry cough associated with fever of about ten weeks' duration. During this period he had also noticed pain in the left side of the chest aggravated by coughing. He had suffered from an illness about twelve months previously, which, he was told, was pneumonia affecting the bases of both lungs.

Physical examination of the chest revealed dullness to percussion and diminution of breath sounds over the upper lobe of the left lung. He had clubbing of the fingers and to a lesser degree of the toes. His sputum had been examined on several occasions, but no *Mycobacterium tuberculosis* was found. A radiologist's report on skiagrams of the chest in July, 1941, was to the effect that there was an opacity in the middle zone of the left lung, probably due to interlobar effusion, and that there was some old thickening in the lesser fissure of the right lung. The blood sedimentation rate was recorded as 109 millimetres in the first hour. The blood count was within normal limits. The officer was believed to be suffering from pulmonary tuberculosis with an interlobar or pleural effusion. For ten weeks he remained in the British hospital, making but little progress, and although he lost his fever, he continued to complain of pain in the left side of the chest.

Early in October, 1941, he was transferred to the Sixth Australian General Hospital. At this time he was of poor physique, looked pale, and had a distressing cough with variable amounts of sputum, which at times was offensive and on one occasion slightly blood-stained. The breath sounds over the upper lobe of the left lung anteriorly were diminished. A report by our radiologist indicated that the shadow in the left lung had altered very little in the three months' interval since the previous examination and now suggested consolidation rather than effusion. The opacity did not resemble that of a hydatid cyst, but it had certain of the radiological features of a gumma (Figures I and II). A Kline test gave a "weak, incomplete positive" result.

Now regarded as suffering from pulmonary syphilis, the patient was treated with oral doses of iodides and injections of bismuth, but when he had failed to respond this anti-syphilitic treatment was discontinued. Pain in the left side of his chest recurred at intervals, and his nocturnal cough was persistent and distressing. Another X-ray examination of the chest in the middle of November, 1941, showed that the area of opacity in the left lung was more extensive. This led to the suggestion that the correct diagnosis was bronchogenic carcinoma of the left lung. Lipiodol was injected into the trachea, but as no blockage was observed in the left bronchus or left bronchial tree the diagnosis of carcinoma lost favour. After this procedure he began to cough more sputum. His temperature rose as high as 102° F. and moist sounds were heard on auscultation

over the left lung. On November 25, 1941, an attempt to aspirate the chest was made. Under local anaesthesia a large-bore needle was introduced through the third left intercostal space anteriorly in the mid-clavicular line. The pleura was felt to be thick and tough. No fluid was obtained, but the lumen of the needle contained some yellow fibrinous material, microscopic examination of which revealed a few polymorphonuclear cells. On December 1, 1941, he was seen by the officer in charge of the surgical division of the hospital, who thought that the abnormal pulmonary shadow suggested a solid growth rather than an interlobar collection of fluid. This officer requested that the Kline test be repeated and that the sputum be examined for the presence of actinomycotic organisms. Both these examinations gave negative results, nor were tubercle bacilli detected in the sputum.

On December 8, 1941, an operation was performed under general anaesthesia. The dull area in the upper half of the left side of the chest was explored by means of a trocar and pus was found in the lower part of the upper lobe of the lung. Thoracotomy was therefore performed and an abscess cavity containing many loculi was drained. About six ounces of thick foul pus were evacuated. Examination of this pus showed the presence of "organisms morphologically indistinguishable from those of actinomycosis". After the operation the patient's condition was never satisfactory. His cough was troublesome and his respirations were rapid and feeble. He died on December 10, 1941, forty-eight hours after the operation.

#### Post-Mortem Examination.

A thoraco-abdominal post-mortem examination was carried out by Major E. B. Jones, pathologist to the hospital, who reported that the body was that of a well-developed male. Approximately in the left anterior axillary line a recent operation wound was present in the chest wall. Through it, after partial resection of the third left rib, an abscess cavity had been drained. The terminal phalanges of the fingers showed some clubbing. When the thoracic cavity was opened the heart was seen to be much dilated, the right ventricle and auricle extending to the right border of the sternum. About a pint of brown fluid was present in the left pleural cavity and an extensive fibrinous exudate covered the pleura of the lower lobe of the left lung. The lung was adherent to the parietal pleura in the region of the operation wound. The upper lobe of the left lung contained some air. On the antero-lateral aspect of this lobe a large abscess cavity, oval in shape and measuring five by three centimetres, was revealed. The inflammatory process around the cavity involved the interlobular septum, the inflamed portion of the lung being of solid consistence and containing numerous small yellow areas. The inflammatory reaction was of such a character as to give the impression that the pneumonia was of the lipoid type. The lower lobe of the lung was completely collapsed. On the antero-lateral border of the upper and middle lobes of the right lung some dense pleural adhesions were visible, and there was considerable hypostatic congestion of the upper and lower lobes. The right auricle and right ventricle of the heart were extremely dilated. Numerous "milk spots" were scattered over the epicardium. The coronary vessels were tortuous. Apart from congestion no abnormal pathological changes were observed in the liver, kidneys or spleen.

Sections made from the tissue of the left lung for histological examination showed the typical structure of lobular pneumonia in the upper lobe, the alveoli being filled with pus cells. Lipoid-laden cells were fairly conspicuous and macrophages containing pigment were observed. Other areas of the lung showed some fibrosis. The pleura was covered with a fibrinous exudate. No evidence of tuberculosis was found.

### A CASE OF PROGRESSIVE CALCIFICATION OF THE PANCREAS SECONDARY TO CHRONIC RELAPSING PANCREATITIS.

By H. C. RUTHERFORD DARLING,  
 Sydney.

Two different types of calcification are found in connexion with the pancreas—true stones in the ducts, and false stones, which are really calcified areas in the parenchyma following old pancreatitis. The following case may be of interest owing to the rarity of the latter condition.

#### Clinical Record.

M.H., a single woman, aged thirty-nine years, was referred to me by Dr. Alan Owen on account of intermittent attacks

<sup>1</sup>This case was discussed at a clinical meeting held at the Sixth Australian General Hospital, Middle East, on December 21, 1941.

of upper abdominal pain of ten years' duration; the attacks occurred every six to twelve months, and each attack lasted from two to four weeks.

On March 9, 1932, she had appendicectomy performed at a district hospital.

In July, 1932, the pain recurred; tenderness and rigidity were present over the upper part of the right rectus muscle, and an indefinite mass could be felt deep to this segment. Radiological examination failed to reveal any lesion of the stomach or duodenum, but some "duodenal irritation" was alleged to be present.

In January, 1933, pain, swelling and tenderness again reappeared; a plain X-ray film disclosed "diffuse calcified areas in the pancreas", and an exploratory laparotomy through a vertical incision over the upper part of the right rectus muscle revealed an apparently normal gall-bladder with diffuse induration and enlargement of the whole of the pancreas.

During the next seven years the patient had many similar attacks, and in three attacks (April, 1933, August, 1934, and December, 1941) the pain was so severe that she was forced to seek medical relief. Each of the three attacks was characterized by the reappearance of a palpable mass in the region of the head of the pancreas. A radiological report, dated August 24, 1933, read as follows: "Shadows more numerous in amount and appear larger."

On examination on February 6, 1942, the patient presented a pronounced asthenic or visceroprotic habitus. Inspection of the abdomen revealed surgical scars over the appendix and gall-bladder regions. Slight rigidity of the upper segment of the right rectus muscle was noted, with an area of deep tenderness above and to the right of the umbilicus.

A number of investigations were carried out. A fractional test meal examination was made on February 13, 1942, and the report read as follows: "No blood or lactic acid was detected. No free HCl was detected. The stomach was not empty at one hundred and twenty minutes. Bile was present in the specimens withdrawn after forty minutes." A blood count carried out on the same date gave the following information: the erythrocytes numbered 4,480,000 per cubic millimetre, the hemoglobin value was 77% (11.2 grammes), and the colour index was 0.87; the hemoglobin content of the cells was variable and an occasional microcyte was seen; the number of leucocytes was 3,600 per cubic millimetre. The urine passed in the twenty-four hours ending February 10, 1942, amounted to 38 ounces, and it yielded a diastatic activity of ten units. No glycosuria was present. The fat content of the stools was estimated on February 24; 3.9% of the dried faeces was split fat, 1.6% of the dried faeces was unsplit fat, and the total fat content of the dried faeces was 5.5%; 71% of the faecal fat was split and 29% was unsplit. Undigested and partially digested muscle fibres were present in the faeces. Cholecystography was carried out on February 25, 1942, and the gall-bladder was found to be small, but filled satisfactorily.

#### Acknowledgements.

I should like to express my appreciation and thanks to Dr. Alan Owen for placing at my disposal his notes of this case; to the staff of the Bureau of Microbiology, who carried out the various biochemical tests; and to Dr. J. G. Edwards for his kindness in supplying the accompanying radiological photographs (Figures I and II), dated December 23, 1941.

#### PULMONARY TUBERCULOSIS FOLLOWING NEPHRECTOMY.

By D. G. MAITLAND, M.B., B.S., B.Sc. (Sydney),  
D.R. (Edinburgh),  
Sydney.

THE following is a report of a case of pulmonary tuberculosis which appeared some years after the removal of a tuberculous left kidney—not an uncommon sequel. It is worthy of record, because it serves to emphasize various facts which may be overlooked not only by the clinician, but also by a potential tuberculous patient, who may be lulled into a false sense of security as a result of a single negative X-ray finding. The points illustrated by this case are of interest because of the publicity which has recently been given to mass radiography of the chest and the suggested investigation in the future of all members of the community.

#### Clinical Record.

Four and a half years ago the patient, a female, aged thirty-one years, had a tuberculous left kidney removed. At the time complete urological, pathological and radiological

investigations were made and the lesion was considered to be a relatively early one. A year later it was found necessary to remove the remaining portion of the left ureter. A pathological investigation of the specimen and an X-ray examination of the lungs gave satisfactory results, and it was considered reasonable to suppose that the operation would eliminate the existing condition.

The patient remained well for two and a half years, and, being a smoker of cigarettes, took no notice of a slight cough. Because of her previous history and the continuance of the cough, together with some loss of weight and lassitude, she was advised to undergo a routine X-ray examination of her lungs. This was carried out on September 27, 1940, and a somewhat lengthy report was given, in which it was indicated that a minimal lesion was present at the apex of the right lung, just below the shadow of the first rib; the opinion was expressed that the lesion was "mainly fibrotic and probably inactive" (Figure I).

The patient, and apparently her medical attendant, were reassured by the report, for she neither underwent any treatment or further X-ray examination nor sought other medical advice until August 18, 1941, when she consulted Dr. Gilbert Bradley, to whom I am indebted for permission to quote this case. He stated that clinical signs were obvious when he examined her. She was then sent to me for X-ray examination of her lungs, and Figure II is a reproduction of the film taken on August 20, 1941. It shows a pronounced right apical lesion with extensive tuberculous mottling throughout the left lung—the changes which had occurred, in the absence of observation or treatment, within the intervening eleven months. Her future does not appear to be a bright one.

#### Comment.

I should like to make several comments bearing upon this case.

Is the radiologist justified in commenting upon the activity of a lesion? In the majority of instances he is able to assess with accuracy the various radiological features, which vary from the soft "cotton-wool" focus to frank calcification; but often it is impossible, or very unwise, to express an opinion in the absence of a previous X-ray film, or without awaiting a further examination for comparison. Signs to guide the clinician may be entirely absent, and a subsequent X-ray examination within a few weeks may be the only method of estimating the activity of the lesion. This procedure should always be adopted when a "primary focus" is discovered.

If a lesion is large enough, or if it is in such a position that it will cast a differential shadow, X-ray examination will demonstrate it, as a rule, before clinical signs of pulmonary tuberculosis are manifest. This is the basic principle of mass survey work. However, radiography is capable only of demonstrating the shadows of the moment, and it is quite possible for a lesion to be in its very earliest stage, or for a "minimal" shadow to be obscured by the shadow of an overlying rib or hilum, by slight movement of the patient, by over-penetration, or by some other technical imperfection of the film. A negative radiographic finding may therefore be recorded. In either case, pulmonary tuberculosis is actually present, yet not recognizable at the time, and a further X-ray examination in the course of a few months or even weeks may give a very different finding indeed. This serves to emphasize the danger of presuming the absence of pulmonary tuberculosis in contacts or potentially tuberculous subjects because of a single negative X-ray finding.

The case I have recorded is an excellent example of negative radiological findings in a tuberculous subject, followed subsequently by positive findings. These observations, which are known to the radiologist, may be overlooked by some clinicians, and certainly by the public, whose members are being educated to pin their faith to the result of one X-ray examination alone.

It is an obvious fact that men serving overseas suffering from pulmonary tuberculosis will be repatriated, despite the efficient radiographic and medical examinations which are provided for all branches of the forces today, though the number will be considerably less than during and after the war of 1914-1918.

A community survey will certainly reveal the seemingly healthy tuberculous individuals and those who have the established disease in its various forms; but for a survey to offer any lasting contribution towards the eradication of pulmonary tuberculosis, it must be repeated at various age periods of every individual. Such a survey would be mainly of academic interest unless supported by law and unless adequate provision were made not only for the accommodation of those who must subsequently undergo lengthy treatment, but also to cover personal insurance and that of dependants.



ILLUSTRATIONS TO THE ARTICLE BY DR. R. A. MONEY.



FIGURE I.  
Skiagram of chest, showing lesion in the right upper lobe regarded as tuberculous and proved not to be.

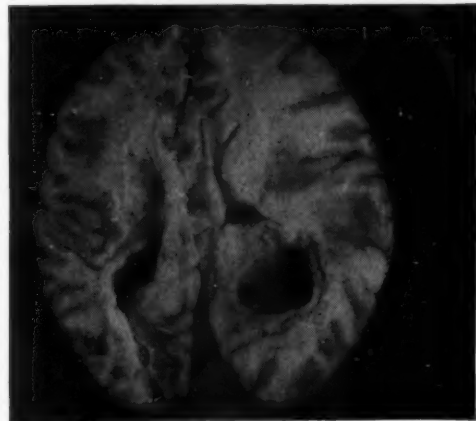


FIGURE II.  
Macroscopic view of cut brain, showing large, deep chronic abscess cavity in right occipital lobe. The compressed and obliterated posterior horn of the right lateral ventricle can just be discerned on its lateral aspect. Note the marked increase in size of the right cerebral hemisphere when compared with the left, and the displacement which has occurred across the mid-line.

ILLUSTRATIONS TO THE ARTICLE BY DR. M. T. COCKBURN.

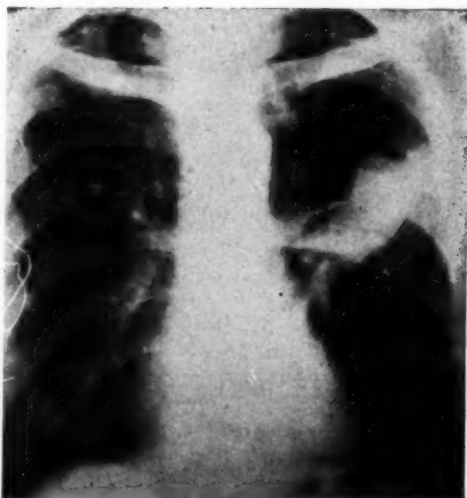


FIGURE I.

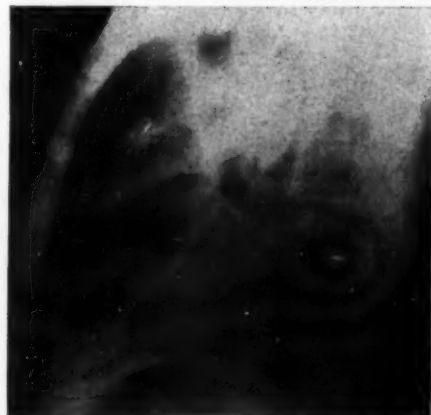


FIGURE II.

ILLUSTRATIONS TO THE ARTICLE BY DR. H. C. RUTHERFORD DARLING.



FIGURE I.



FIGURE II.

ILLUSTRATIONS TO THE ARTICLE BY DR. D. G. MAITLAND.

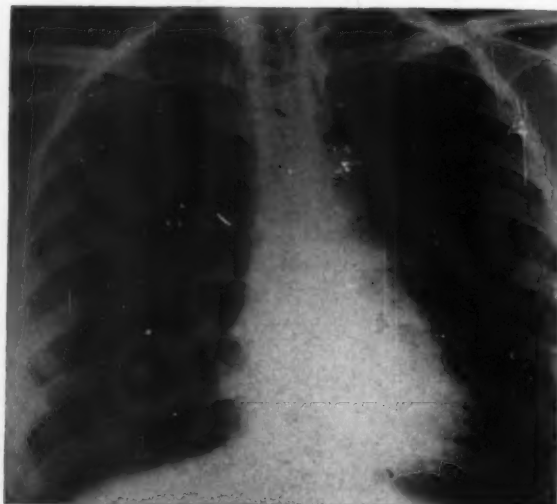


FIGURE I.

Skiagram taken on September 27, 1940. The small infiltration is barely perceptible, running parallel with and just below the right first rib. The lesion was reported as being "mainly fibrotic and probably inactive".

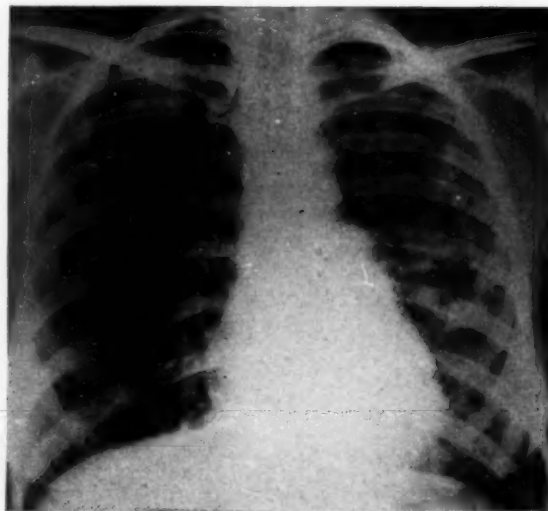


FIGURE II.

Skiagram taken on August 20, 1941, showing a pronounced right apical lesion and mottling throughout the left lung field—the changes which had taken place during the intervening eleven months.

# The Medical Journal of Australia

SATURDAY, JULY 4, 1942.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

## THE HEALTH OF SCHOOL CHILDREN: A VICTORIAN REPORT.

"HEALTHY children may reasonably be expected to grow into healthy adults." These words are taken from the report for the year ended June 30, 1941, by Dr. Eileen Fitzgerald, Chief Medical Inspector of the Department of Education in Victoria, on medical inspection of school children; around them a vigorous and incisive lecture might be drafted for the edification of the people of Australia. Since healthy children will in all probability grow into healthy men and women, the converse is also true—children who are afflicted with disease of mind or body start life with a handicap and are not so likely to achieve health as their more fortunate brothers and sisters. Since health is beyond question man's most prized possession, any means that can be adopted to assure the health of children become of vital importance. It is just about twelve months ago since Dr. Fitzgerald's last report was discussed in these columns, and the opportunity was taken of emphasizing the value to the individual and to the community of the regular inspection of school children. That Dr. Fitzgerald's report is again brought to the notice of readers needs no apology. Last year we pointed out that Dr. Fitzgerald was not content to confine the activities of her department to the routine inspection of children, though that alone would be a justifiable course of action and one which in due season would yield a rich harvest. Last year she reported on special investigations and she has done the same this time.

Before Dr. Fitzgerald's special investigations are mentioned reference must be made to the routine work of the past year. In her opening sentence she states that no expansion of the school medical service has taken place since the last report was issued. Last year we stated that the requirements of the fighting forces would probably prevent any increase in the staff of the department, although an increase was obviously needed. In the circumstances we can probably feel gratified that the staff numbers remain practically the same, for only one dental attendant has been lost. The staff is full-time and consists of seven medical officers, nine dentists, ten dental

attendants (three temporary), three school nurses (two temporary) and two disinfectors (one temporary). During 1940-1941 the routine was interrupted by sick leave of the staff and by the temporary absence of a medical officer who undertook special investigations. Some reduction in the amount of work done was to be expected, but in only one section did this occur. The number of children examined for the year was 28,359, as against 32,808 for the previous twelve months. The number of teachers examined was 2,191 (last year the figure was 1,727). The school dentists treated 28,964 children, as against 28,374 for the previous year. Although 21,919 of these children were in the country, Dr. Fitzgerald mentions the excellent mouths of children in the poorest suburbs. Dental inspection and treatment of school children must have had some share in the bringing about of this state of affairs in the suburbs, and we are justified in concluding that an improvement has also taken place in the country. This tends to confirm a statement made in these columns regarding which some doubt was expressed, namely, that dental caries is nowadays much less in evidence than it used to be. School nurses during the year paid 7,199 visits to 6,229 homes (the figures for last year were 6,946 visits to 5,570 homes). The value of visits to the homes of children by the school nurse needs no emphasis in a journal intended for medical readers. Non-medical persons do not need much imagination to realize the enormous value of a visit to a home by a nurse capable of giving advice and help in the carrying out of instructions given by a medical examiner and of discovering new and relevant facts in the child's home environment. Nowhere would this be greater than in the eradication of such conditions as impetigo, scabies and pediculosis. Dr. Fitzgerald states that the standard of cleanliness in Victorian school children has been high. She is, however, concerned about the fact that more and more women are obtaining employment outside their own homes, and in consequence have less time than they used to have to supervise their households. (We have been told recently that more than half a million women in Australia are occupied in jobs connected with the war effort.) Everyone who knows much about such a condition as scabies will agree that in its treatment a nurse's visit to the home of a patient is far and away more valuable than any directions given in consulting room or hospital out-patient department. Dr. Fitzgerald thinks that municipal cleansing stations, where people could attend for the cleansing and disinfection of themselves and their belongings, would materially help to banish scabies. With this we are prepared to agree, provided the instruction begins in the home and the municipal centres are mere adjuncts. In the circumstances there appears to be an unanswerable argument for the appointment of more nurses to Dr. Fitzgerald's staff.

The first of the special investigations was an inquiry into the relation of social and economic conditions to the health of the school child. This inquiry was made by school nurses in the "inner industrial areas" in the course of their routine follow-up work for the remedying of defects discovered by the school medical officers. The nurses were furnished with lists of children who were described as "A" class and "C" class. "A" class children were of average or above average weight for height and of satisfactory general condition; "C" class children were



below average weight for height and of unsatisfactory general condition. Unfortunately we are not told how many children or families were covered by the inquiry, and for this reason the conclusions must be accepted with caution. We are told, however, that much of the data had to be discarded on account of its possible unreliability. Information was collected about family income, rent of house, parents, number of children in the family, clothing, meals, overcrowding and the condition of the house. The conclusions are summed up in the following way.

1. The percentage of "C" children was highest where mothers were working full-time or part-time or had deserted or were ill. The consequent bad housekeeping and poor meal planning were not necessarily associated with poverty.
2. The percentage of "C" children was high where fathers were dead or had deserted or were invalid pensioners.
3. The diet of the "C" children was less satisfactory than that of the "A" group.
4. Overcrowding was more marked in the "C" families.
5. The clothing of "C" children was little different from that of "A" children. This may be accounted for by the help received from various sources.
6. The number of houses that were damp and in bad repair dirty and condemned was high in both classes, but more so in the "C" class.
7. The rents paid were generally too high and did not differ much in the two classes.
8. "C" class children predominated over "A" class children in families where there were five children or fewer. Where there were six children or more, the "A" class predominated. This, no doubt, was because some of the elder children were wage-earners.
9. Sometimes an "A" child and a "C" child were found in the same family, living under identical conditions.

These suggestive observations have an added interest when they are considered with the results of another investigation into one hundred cases of truancy. One hundred truant children (73 boys and 27 girls) were investigated by Dr. Mühl; 88 of the children were examined by school medical officers. Of the children examined, 31% had the guardianship of only one parent. Of the fathers, 54% were in regular work at the time of examination, but 14.8% of these had had long periods of either unemployment or casual work. A large percentage of the mothers were working either full-time or part-time; 27% were working just before the examination, but at the actual time of the examination 21% were working either full-time or part-time. From these observations the conclusions are drawn that financial insecurity was a factor; there would also be less parental control, more poor house-keeping. The fact that more work devolved on the girls in the families concerned is thought to have been responsible for some of the non-attendance. The medical defects present in the children of this series were more numerous than among those in regular attendance at school. Moreover, 17% of the children had been deprived of their proper quota of schooling through long periods of illness and irregular attendances due to shorter illnesses. Five of the children, aged seven and a half, eight and a half, nine, eleven and twelve years could neither read nor write. Grading according to chronological age instead of mental age was found to have had an adverse effect on attendance at school. The ratio of the number of truants from residential areas to those from industrial areas was as 1 is to 4. Both these investigations show that economic conditions can have a profound influence on the school child and on his schooling. An additional indication of

this comes from another investigation reported in a separate appendix. It was found that 22 of 371 children attending schools in dairy-farming districts were working and travelling for more than twelve hours in each school day—from the time of rising in the morning to the time of sitting down for the evening meal. Thirteen of these 22 children were boys and nine were girls; their ages ranged from eight to fourteen years. Their duties before and after school were mainly associated with cows and pigs. The children also walked, cycled or rode distances ranging from half a mile to five miles each way to and from school. We do not need to be told that they had little recreation or outside interest. In spite of this hard work and the long hours, the physical development on the whole was not affected. This is explained by the country environment and by the fact that food is generally abundant. On the other hand, the children were, as might be expected, dull and tired and sleepy at school. No one will disagree with the statement that chronic fatigue of this kind interferes seriously with the mental development of the children, their progress and their happiness.

The sections of Dr. Fitzgerald's report that have been discussed show once more that, as she herself states, the standard of health of a nation can be raised by the extension of medical inspection and its auxiliary services. It also shows that the present is a time when more attention than ever should be given to supervision of the health of children. Mothers are leaving their homes, often for full-time employment, to further the war effort of the nation. The medical supervision of school children is one way in which mothers engaged in industry can be helped. It must also be remembered that food costs more than it did, that some kinds of food are scarce, and that the effects of both price and scarcity in regard to the child may be far-reaching.

## Current Comment.

### THE TREATMENT OF SUBACUTE BACTERIAL ENDOCARDITIS.

Most students have had the necessity for correctly diagnosing subacute bacterial endocarditis impressed on them by their teachers, and a disease in which there is a pathological finding of "flea bitten" kidney will not be quickly forgotten; but it is only rarely that it is pointed out that this is one of the diseases whose sufferers tend to gravitate to the public hospitals and which are seen only infrequently in private practice. Nevertheless when such cases occur the question of successful treatment presents a much greater problem than the diagnosis. With the advent of the sulphonamides great hopes were at first held that they would represent a definite advance in the treatment of subacute bacterial endocarditis. Isolated reports of apparent cures after the exhibition of the sulphonamides have from time to time appeared, but in most instances such treatment has been in vain. The inaccessibility of the organisms deep in the vegetations is the probable reason for the failure of the sulphonamides which have been so successful in most of the other streptococcal infections. Attempts have been made by the administration of heparin along with the sulphonamides to decrease the formation of the vegetations, but in most cases this method of treatment has been attended with only a slight delay in the progress of the disease. In an attempt to place the sulphonamide treatment of subacute bacterial endocarditis on a more rational basis, Mary A. Poston and Edward Orgain<sup>1</sup> studied the *in vitro* effects of sulphanil-

<sup>1</sup> The American Journal of the Medical Sciences, April, 1942.

amide, sulphapyridine, sulphathiazole, sulphadiazine and the sodium salts of the latter three drugs on organisms isolated from proven cases of subacute bacterial endocarditis. With one exception in a series of 25 strains they found that no drug was bacteriostatic unless sodium sulphapyridine was also effective. (The exceptional strain was isolated from a patient with subacute bacterial endocarditis who had been previously treated with sulphapyridine.) Sodium sulphapyridine exhibited the greatest effectiveness in the greatest number of strains. These authors suggested that because of the great variation of effectiveness *in vitro* of sulphanilamide and related drugs on *Streptococcus viridans*, it is important to test the bacteriostatic effect in the test tube of various sulphonamides before chemotherapy is instituted in the treatment of patients suffering from subacute bacterial endocarditis. If laboratory facilities are not available these authors recommend the use of sodium sulphapyridine. It is not surprising that heparinization was not been mentioned by Poston and Orgain, for the value of this method of treatment has not been finally decided. The suggestion that these authors make of testing the effectiveness of the sulphonamide on the organism *in vitro* before administration to the patient is a valuable one, and one which might be applicable to some other diseases.

#### CARCINOMA OF THE UTERINE FUNDUS.

It has often been said that early diagnosis is one of the most potent factors in determining the prognosis of most cases of malignant disease; carcinoma of the uterine fundus is no exception to this rule. The importance of early diagnosis of carcinoma of the uterine fundus and of regarding any vaginal hæmorrhage occurring after the menopause as due to a malignant lesion until the contrary is proved is stressed by R. E. Fricke<sup>1</sup> in a recent review of the results of irradiation therapy of carcinoma of the uterine fundus obtained at the Mayo Clinic. It has been stated of malignant disease of some viscera, such as the stomach, that little is gained if by diagnostic endeavour we are able to subject the patient to treatment a few weeks earlier than would otherwise be possible. Such despondency is entirely unwarranted with regard to carcinoma of the uterine fundus, for in this disease treatment probably offers more hope than does treatment of any other internal malignant neoplasm. From examination of the cervix and vaginal wall and of the material obtained by diagnostic curettage Fricke has classified his cases and compared the results obtained with the three methods of treatment, surgery alone, irradiation plus surgery, and irradiation alone, in the various classes of cases. Because of the slow growth of this malignant condition and the late tendency towards metastases Fricke concludes that the best treatment for patients in good health and with localized tumours consists of complete hysterectomy followed by irradiation. With more advanced or more malignant lesions, when other diseases are present, or for less robust patients well planned irradiation therapy offers quite a chance of success. By early diagnosis Fricke means at the stage when the uterus is not enlarged and is freely mobile, when the growth is limited to the body of the uterus, and when it is situated within the internal os. For irradiation Fricke placed most reliance on the topical application of radium to the uterine fundus followed by a course of high voltage X-ray treatment. The technical details of the method of treatment do not concern us here, but the results reported are worthy of praise. Of the patients treated with adequate irradiation therapy 50% showed five-year cures, while in those cases in which palliative treatment only was possible the relief of the pain and the abatement of the hæmorrhage and of the malodorous and irritating discharge justified the use of irradiation therapy. Even with limited treatment 11 of 40 patients achieved five-year cures. These figures are sufficient indication of the need for early diagnosis and treatment.

<sup>1</sup> Proceedings of the Staff Meetings of the Mayo Clinic, April 1, 1942.

#### DIABETES MELLITUS AND FURUNCULOSIS.

GENERAL impressions in medicine are formed for all sorts of reasons, and statements about them may be repeated so often that no one thinks of questioning their truth. Eventually it becomes difficult to sift what is true from what is false. For example, it cannot be denied that such factors as the sex of the patient play a part in the ætiology of gall-stones, but in regard to many other factors accused of participating in the ætiology of this disease, for example, pregnancy, the relationship is more apparent than real; and this has been demonstrated repeatedly in several large series of cases, such as that of D. M. B. Gross.<sup>1</sup> Similarly, from an extensive review of the literature and hospital records, John R. Williams<sup>2</sup> has concluded that there is little support for the impression that *diabetes mellitus* predisposes the patient to pyogenic skin infections. In the last twenty-five years there have been only seven articles listed in the *Index Medicus* dealing with carbuncles or furunculosis associated with diabetes. A study of the admissions to two large hospitals showed that of 27,209 patients, 330 had *diabetes mellitus*, and of these diabetic patients only eight had boils or carbuncles, whereas among the remaining 26,879 patients there were 166 patients suffering from boils or carbuncles. Similar figures were obtained in other hospitals and in general practice. It would appear, therefore, that diabetic patients are not so liable to develop boils and carbuncles as has been commonly taught. These findings do not, of course, detract from the seriousness of the effect of furuncles and other infections on the response to insulin when such infections develop in a diabetic patient. Undoubtedly fatalities have directed attention to the combination of *diabetes mellitus* and furunculosis, and have tended to give a false estimate of the frequency of this combination. Williams has also shown that both complications occur oftener in old age; and elderly diabetic patients may be expected to develop furunculosis oftener than younger patients; but this again does not necessarily indicate any causal relationship between the two diseases.

#### EAR LOBE OR FINGER FOR BLOOD SAMPLE.

THE old debate where to obtain a sample of blood for cell counts and hæmoglobin estimation has come again to the fore. The votaries of ear lobe and finger have displayed much enthusiastic disagreement and have taken themselves so seriously as to suggest sometimes the small-end and the big-end parties in Swift's "Lilliput". Naturally if one technique is proved beyond cavil to be superior to others it will be adopted eventually by the profession. G. Brückmann, of Tel Aviv, has made a series of comparisons between venous blood, finger tip blood and ear lobe blood and has found consistent agreement between vein and finger tip.<sup>3</sup> On the other hand blood from the ear lobe contains so much more hæmoglobin, according to him, that its rejection as a representative sample is advocated. There is this to be said in favour of the adverse criticism of the ear technique, that a small specimen of blood to be regarded as typical should be taken from a vessel or vessels where the circulation is active. It is rarely active in the ear as the reddening which follows even minor irritation well testifies. When blood is sluggishly flowing and especially when there is stasis there is a marked alteration in the hæmoglobin concentration; as a rule it rises. The one point on which Brückmann does not enlighten us is why the circulation in the finger pulp should not be at times just as low in velocity as in the ear. A cold, raw winter day will produce cyanosis of the hand as readily as in the ear. Brückmann promises to report the results of further investigations and to suggest standard methods of procedure. These will be awaited with interest.

<sup>1</sup> The Journal of Pathology and Bacteriology, Volume XXXII, 1922, page 503.

<sup>2</sup> The Journal of the American Medical Association, April 18, 1942.

<sup>3</sup> The Journal of Laboratory and Clinical Medicine, January, 1942.

## Abstracts from Medical Literature.

### SURGERY.

#### War Wounds of the Head.

RALPH B. CLOWARD (*The Journal of the American Medical Association*, January 24, 1942) presents a report on the types of head injury resulting from the bombing of Hawaii, and their treatment. Nearly all the wounds were compound depressed fractures of the skull produced by pieces of shrapnel, which varied in size from thin flat pieces less than 1.0 centimetre in diameter to large irregular pieces 3.5 to 4.0 centimetres in width and 0.5 to 1.0 centimetre in thickness. The larger pieces all had sharp jagged points, which ripped great irregular holes in the tissues of the head. No smooth round bullets were found in this series of casualties. The type of wound depended on the size of the missile and its position when it made contact with the head. Some scalp wounds were small enough to be missed on casual examination. The missiles must all have been travelling at high speeds, since the defects in the skull were uniformly circumscribed holes. There were no long fracture lines radiating from the point of entry. Smaller fragments usually made small holes in the outer table of the skull; but the hole found in the inner table was many times larger than the missile. Shattered bone fragments were carried deeply into the brain, lacerating cortical vessels and brain substance over a wide area. The more extensive injuries to the head were invariably fatal. Injuries to the brain and its coverings were as a rule much more extensive than would have been expected from the size of the foreign body or the condition of the patient. Treatment of such wounds has two aims: (i) to restore the injured tissues as nearly as possible to normal; (ii) to prevent complications that may result in disability, deformity or death. Preliminary treatment is important. When the patient is first seen, the hair about the wound is clipped and the edges of lacerated wounds are cleansed with soap and water. Haemorrhage from large vessels is stopped with a haemostat, by local pressure or with a piece of rubber tubing about the head. The wound is then filled with one of the sulphonamide drugs in powder form and a temporary dressing is applied. Morphine is not given, unless the patient has other extensive, painful wounds. At hospital the patients are examined neurologically and given tetanus antitoxin; skiagrams of the skull, stereoscopic views when possible, are taken. Shock is treated with saline solution, blood plasma or whole blood. Operation is performed as soon as possible after shock has been dealt with. Even after thirty-six hours' delay no infection occurred when the preliminary treatment of the wound was carried out as described. Most patients were conscious and cooperative. The author describes in detail the operative routine used for the Hawaii casualties, and stresses the importance of tight closure of the *dura mater* with a patch obtained from the periosteum of the overlying skull, especially when the wound passes through any of the paranasal sinuses.

Such a procedure prevents the formation of a fistula, with cerebro-spinal fluid draining through the nose and the possible development of meningitis. He also emphasizes the need for thorough débridement of the missile's tract through the brain. Accessible metallic foreign bodies in the brain should, in the author's opinion, be removed; but he does not advocate the causing of more damage in the brain in order to extricate a deeply seated foreign body. The use of the electro-magnet in such cases may be of value. The danger when foreign bodies are left in the brain is the development of a cerebral abscess and convulsive seizures at a later date. Patients are kept at absolute rest in bed after operation, and pain is controlled with acetylsalicylic acid and barbiturates; chemotherapy is used for a week or ten days after operation. The routine use of an anticonvulsive drug in adequate doses is recommended, and patients are urged to continue its use for at least a year. In this series of cases few of the patients with penetrating wounds of the head were unconscious or had lost consciousness at all; they were in a state of mild shock. Patients with severe wounds caused by large objects striking the head, however, were deeply unconscious and died shortly after admission to hospital. In conclusion the author stresses the value of the generous use of sulphanilamide in the scalp and skull wound and in the missile tract in the brain. Sulphanilamide is much more rapidly absorbed into the blood stream from an open wound than any other sulphonamide drug.

#### Intracranial Infections.

A. C. FURSTENBERG (*Surgery, Gynecology and Obstetrics*, February 16, 1942) discusses intracranial infections, with particular reference to their methods of spread from the ear and from the accessory nasal sinuses. He comes to the conclusion that while the spread of infection from the ear and sinuses to the intracranial structures does occur by way of the blood stream, especially in sinusitis of swimmers, yet the usual method is by continuity and contiguity of tissue when the primary lesion has reached the subacute or chronic stages. Sinusitis in the swimmer is a dangerous disease; when the infection invades the intracranial structures it is apt to do so rapidly and to produce serious complications after a very short incubation period. The author believes that "bone work in the presence of a green infection" should be avoided, except in cases in which it is obviously imperative. It may be necessary to sacrifice bone early in the acute process, in order to discover and drain a cerebral abscess. Meningitis and cerebral abscess are sometimes caused by an intracranial yet extradural infection, spreading in the form of a confluent or patchy exudate over the surface of the *dura mater* beneath the inner table of the skull. By way of treatment the author recommends eradication of the primary focus of infection by surgical means and by adequate doses of the sulphonamide drugs. He considers that sulphadiazine will replace other sulphonamides in oto-rhino-laryngology. It is a specific against *Streptococcus viridans*, *Streptococcus haemolyticus*, pneumococci of all types, meningococci and Friedländer's bacillus. There is also good evidence that it has a specific effect upon the staphylococcus, which the author

believes plays in mixed infections the part of a "hanger-on". Moreover, sulphadiazine is less toxic than related compounds and may be given in the home, provided that the patient is carefully examined every day by his physician.

#### Gunshot Wounds of the Abdomen.

AMBROSE H. STORCK (*Surgery, Gynecology and Obstetrics*, February 16, 1942) reviews recent advances in the treatment of abdominal wounds caused by bullets, by fragments of shells and hand grenades, and by "blast". Improved methods of collection, transportation and early treatment of these casualties have made possible operative treatment within six or twelve hours after injury, and so reduced the number of hopelessly delayed cases. The use of body armour as a preventive measure is established. Other preventive measures, aimed at reducing the severity of peritonitis resulting from penetration of the abdomen, are: (i) alteration of the intestinal flora by its replacement with non-pathogenic bacteria, and (ii) sterilization of the bowel contents by administration of intestinal antiseptics. The efficacy of immunization with tetanus toxoid has been proved. More accurate means are available for the estimation of the status of patients with known or suspected abdominal injuries. The degree and duration of shock and haemorrhage often determine the outcome in such cases; their earlier detection is possible by the use of new methods. Peritoneoscopy may avert unnecessary laparotomy or indicate its need, when this is not revealed by other methods of examination. Excretion pyelo-ureterography and retrograde cystography make possible more accurate estimation of the extent of injuries to kidneys, ureter and bladder. The evolution of methods for preserving and administering whole blood and liquid or dried plasma has been of great value. It seems possible that the isolation of bovine serum albumin suitable for treatment of shock and haemorrhage in human subjects will augment the substances available for this purpose. Recent work has indicated that plasma and whole blood are equally effective in restoring blood volume, and that in the transfusion of large amounts only one pint of whole blood is needed in every three pints of plasma and blood administered. A distinction should be made between primary shock, in which recovery follows rest and the administration of morphine, and secondary shock, which is associated with persistently low systolic blood pressure, and in which blood transfusion is required. Oxygen therapy is also useful. The efficacy of adrenal cortical extract and of pituitary extract and concentrated serum in secondary shock is proved. A thrombin preparation, employed by H. P. Smith, will control bleeding from liver lacerations when haemostasis by other means is difficult or impossible; the preparation is applied topically. With regard to the management of ileus and peritonitis, the author deplores the use of lavage and drainage and the performance of enterostomy. The condition can be controlled by the exhibition of sufficient morphine to maintain intestinal tone and by the use of the Miller-Abbott tube, with the administration of oxygen if necessary. Plasma transfusion is recommended, as also is the employment of the sulphonamide drugs, introduced into the peritoneal cavity



and given parenterally. "Penicillin" and "Gramicidin" promise to be useful in the treatment of infections not responding to the sulphonamides. Morbidity and mortality in gunshot wounds of the abdomen are reduced if *épluchage* and closure of wounds with non-absorbable suture material are supplemented by the maintenance of normal plasma protein levels and the prevention of avitaminosis. Serious nutritional deficiencies can be prevented by suitable measures, at least for several weeks, and the incidence of pulmonary complications can be lessened by early mobilization, deep breathing exercises *et cetera*. When sucking chest wounds are also present, tension pneumothorax should be at once relieved and paradoxical respiration prevented. Early and careful search for possible residual abscesses by X-ray or physical examination will avert deaths from these complications. Retained foreign bodies in such areas of suppuration should as a rule be removed at the time when drainage is established.

#### Spontaneous Rupture of the Stomach.

W. T. LEMMON AND G. W. PASCHAL (*Annals of Surgery*, December, 1941) report a case of spontaneous rupture of the stomach following the ingestion of sodium bicarbonate. There was no precedent trauma or pathological condition, and the authors stress the rarity of the condition and review the literature on rupture of the stomach from all causes. In the case reported the patient was an obese female, aged fifty-one years, who had been over-eating and over-drinking. A draught of water containing several teaspoonfuls of sodium bicarbonate was followed immediately by severe generalized abdominal pain, which persisted and was also felt in the right shoulder. She vomited repeatedly, the vomitus consisting of stomach contents and small quantities of blood. On her admission to hospital the patient's abdomen was rigid, but had not the "board-like" rigidity seen after rupture of a peptic ulcer. Suction drainage of the stomach and intravenous therapy were instituted. X-ray examination showed gas in the peritoneal cavity. Operation was performed about sixteen hours after the onset of symptoms. Much partially digested food was found in the peritoneal cavity, being mostly confined in the lesser sac. There was a tear five inches long running from the lower part of the oesophagus along the lesser curvature. No pathological condition of the oesophagus or stomach could be found. The laceration was closed with great difficulty. The patient died six hours later. The authors point out that the diagnosis of spontaneous rupture of the stomach has never been made before operation. Five of the 31 patients whose histories are reviewed were operated upon; two recovered.

#### Local Sulphonamide Therapy.

SAMUEL P. HARRISON AND J. ALBERT KEY (*Archives of Surgery*, January, 1942) report a series of experiments to determine the influence of the local implantation of sulphonamide drugs into wounds and into the peritoneal cavity on the healing of the wounds and on peritoneal adhesion formation. Abdominal wounds were made in rats, guinea-pigs and rabbits. In each animal two wounds were made and sutured, one of the wounds being treated with sulphanilamide powder

before suture, and the other acting as a control. At intervals the animals were killed, strips of abdominal wall including the wounds were excised, and the strength of the wounds was estimated by suspending weights and observing the weight which could be borne before disruption at the site of the wound occurred. The authors were convinced that the use of a moderate amount of sulphanilamide in the wounds did not materially affect the rate of healing or the tensile strength of the wound. Wounds were made in the stomach and duodenum of dogs and sutured; sulphanilamide powder was used in some cases and in others the wounds were left without powder, to act as controls. At intervals the dogs were killed, the affected portion of bowel was excised, both ends were closed, and the segment was inflated until disruption occurred. The tension necessary to cause disruption was noted. Again, the use of the drug did not appear to delay healing or to reduce the tensile strength of the wound. In order to test the effect of the drug on peritoneal adhesion formation, rats were used. The abdomen was opened and 500 milligrammes of sulphanilamide powder were introduced and spread by sweeping a blunt curette round the abdomen. In controls the abdomen was opened, the curette was swept round, but no powder was introduced. After twenty-eight days the animals were killed. In neither group of animals were any adhesions found apart from omental adhesions to the abdominal wound in a few cases. The authors conclude that in rats the introduction of sulphanilamide powder into the abdomen does not promote adhesions.

HAROLD LAUFMAN AND CATHERINE E. WILSON (*ibidem*) report a series of experiments on rats to show the effect of prophylactic and therapeutic local sulphonamide treatment of peritonitis. The peritoneal cavity was infected by a culture of *Bacterium coli* and *Streptococcus faecalis*. In one series sulphanilamide was introduced simultaneously. In another this same procedure was followed by additional subcutaneous administration of the drug. In a third series the sulphanilamide was introduced four hours before the bacterial culture, while in a fourth the drug was not introduced till some hours after peritonitis had become established. In each series controls were used in which no sulphanilamide was administered. A marked difference was shown between the controls and the treated animals. The most marked difference was in the series in which the sulphanilamide was introduced four hours before the infecting culture. In this series 100% of the treated animals were alive after twenty-four hours, while only 13% of the controls survived this period. The least effect was seen in the cases in which the drug was not introduced until after peritonitis had become established, but even in this series the mortality appeared to be reduced by the administration of the drug.

#### Cotton as a Suture Material.

FOLLOWING dissatisfaction with the use of catgut as a suture material, there has been a revival of interest in recent years in the use of unabsorbable suture materials. William H. Meade and Carroll H. Long (*The Journal of the American Medical Association*, December 20, 1941) write

concerning the favourable impression which they have obtained of cotton as a suture material after investigating its use in 465 operations by the members of the Tulane University surgical service at the Charity Hospital. Earliest reports of the use of cotton for surgical purposes date back to 500 B.C. In 1939 Meade and Oschner made an experimental study which demonstrated that whereas dry sterilized cotton has less tensile strength, size for size, than catgut, silk or linen, its tensile strength is less altered by sterilization than is that of other suture materials, and after implantation in the tissues it showed much less impairment of tensile strength than did any of the others. Furthermore, when placed in tissue, cotton did not cause oedema or allergic responses and stimulated less cellular tissue reaction than other suture materials. The present authors have used this material extensively wherever interrupted sutures were suitable. They advise against its use as a continuous suture and have substituted catgut in certain circumstances—for instance, where it was necessary to save time in covering the gall-bladder bed or for the mucosal suture in intestinal anastomosis. Even in contaminated wounds cotton was found to be the most suitable material, and nearly 50% of these wounds healed by first intention. The incidence of wound complications was very much less when cotton was used than when either catgut or silk was chosen, irrespective of whether the wounds were clean or contaminated at the time of operation. A further, though minor, advantage is the relative cheapness of cotton as compared with either catgut or silk.

#### The Injection of Fluid via the Bone Marrow.

L. M. TOCANTINS, J. F. O'NEILL AND A. H. PRICE (*Annals of Surgery*, December, 1941) discuss the difficulties encountered in the intravenous injection of blood and other fluid into patients suffering from traumatic shock. They report four cases in which fluid was administered via the bone marrow, and describe the technique employed. The authors argue that the blood spaces in the bone marrow offer an ideal site for the introduction of fluid in patients whose peripheral veins are not accessible—for example, when they are collapsed. In the marrow the rigid surroundings prevent such collapse and probably enable more forcible injection to be made without over-distension and leakage. There is evidence to show that substances injected into the bone marrow cavity are taken immediately and apparently unchanged into the venous circulation, and the method has been employed in the treatment of 72 patients without any local or constitutional reactions. A suitable sturdy needle is introduced into the marrow cavity of the manubrium or sternum, and its correct placing is confirmed by the aspiration of marrow. The authors used a syringe, which for convenience may be fitted with tubing and a valve. They consider that the method may be useful for the emergency treatment of mutilated patients, or for patients with such extensive skin burns that use of the veins of the extremities is impossible. They also stress the need for strict observance of all precautions, and suggest practice on a fresh cadaver to bring about familiarity with anatomical landmarks.

## Naval, Military and Air Force.

### CLINICAL MEETING IN THE MIDDLE EAST.

A CLINICAL meeting was held at Number 6 Australian General Hospital, Middle East, on December 21, 1941. The attendance was large, 220 medical practitioners being present. These included Major-General S. R. Burston, C.B.E., D.S.O., V.D., Brigadier W. W. S. Johnston, D.S.O., M.C., E.D., Colonel J. S. Stelgrad, Colonel N. H. Fairley, O.B.E., Colonel W. A. Hales, D.S.O., representatives of the Royal Army Medical Corps, the Royal Air Force, the Australian Army Medical Corps, the Indian Medical Services, the Mayer de Rothschild Hadassah University Hospital, Jerusalem, and the civil medical services of Palestine.

Radiological and pathological exhibits prepared by Major K. B. Voss and Major E. B. Jones respectively were on view. After Colonel R. A. Money, M.C., E.D., had welcomed the visitors, the chair was taken by Lieutenant-Colonel C. G. McDonald, who conducted the meeting.

#### Diphtheria.

MAJOR S. V. MARSHALL opened a discussion on the various aspects of the complications and treatment of diphtheria. A patient with extensive post-diphtheritic paralysis was first shown, practically the whole of whose skeletal musculature was involved. Palatal, pharyngeal, laryngeal and oesophageal pareses were especially striking features, and had occasioned much difficulty in the maintenance of nutrition, as well as much discomfort from the aspiration of fluids. The anticipated intercostal and diaphragmatic paralysis fortunately had not eventuated, and the patient seemed to be recovering. Phonation was returning and evidence of a ciliary paresis had disappeared. Meanwhile, an alarming tachycardia, which had persisted for six weeks, was subsiding.

The patient, aged thirty-four years, had been admitted to hospital on the second day of his disease. The temperature was 103° F., the pulse rate was 96 per minute and the respirations numbered 22 per minute. There was a severe acute inflammatory faucial lesion, with considerable oedema. Extensive membrane was present on the tonsils, faucial pillars, soft palate and uvula. Toxæmia was severe and salivation was constant and profuse. The cervical lymphatic glands were much enlarged, and swelling of the surrounding tissues was present. Dysphagia was a pronounced feature. According to McSweeney's classification, the patient's infection was of the third grade in severity.

Antitoxic serum was given intramuscularly in the following dosage: 30,000 units on the day of admission to hospital, 24,000 units on the next day, and a further 40,000 units three days later. On the assumption that a secondary streptococcal infection was present, sulphanilamide was given in addition, to a total of 25 grammes over a period of four days. Improvement was slow and the local lesion took nearly a fortnight to subside completely. The general response, however, was rapid and the patient later appeared to be making a satisfactory recovery, so that he was allowed out of bed for short periods towards the end of the third week of the disease. About this time he began to complain that swallowing was becoming difficult and that he had to wash down all solid foods with water. From that time onwards the paresis and tachycardia became progressive, and their climax was sustained through the sixth, seventh and eighth weeks of the disease. A heavy albuminuria was also present. On the forty-third day of the disease, after consultation with Lieutenant-Colonel C. G. McDonald, 96,000 units of antitoxic serum were given with the object of neutralising any free toxin and so arresting the progress of the condition. A rather severe anaphylactic reaction followed, a striking initial feature being a transient bradycardia of obscure origin. Subsequently there was slight fever, and increased tachycardia was noticed, which slowly subsided. Four days later a further injection of 48,000 units of antitoxic serum was given without ill effects. Meanwhile the patient had developed aphonia and increasing difficulty in swallowing fluids. Palatal paresis became complete, and an adductor paresis of the vocal cords was observed to be present. Coughing became ineffective, and accumulation of mucus in the trachea caused the patient much distress. Increasing paresis and wasting of the muscles of the lower limbs also occurred, and considerable loss of sensation in the feet and hands developed. There were increasing general weakness and breathlessness with a tendency to cyanosis. Continuous oxygen therapy was begun in the eighth week, transnasal insufflation being employed, with distinctly beneficial effects, subjective and objective.

The ninth week seemed to be a turning point; swallowing had improved, the tachycardia had subsided and the albuminuria had practically disappeared. At the time of the meeting, in the tenth week of his illness, the patient was stronger, his nutrition was much improved, his ciliary paresis had gone and his palatal paresis was going. Whether massive antitoxin therapy was of significance in this improvement was questionable; but Major Marshall thought that another case suggested that it might be of value.

The patient concerned in the second case, a medical officer attached to a British regiment, developed severe nasopharyngeal diphtheria four months prior to the meeting, with much faucial oedema and swelling of the neck. Antitoxic serum was not given until the fifth day, when he had 48,000 units, and on the next day and three days later 30,000 and 30,000 units respectively were given. The local lesion had taken about two weeks to clear and he had then felt well. About a month later palatal paresis and weakness in the lower limbs with numbness of the feet developed. The significance of these developments did not seem to have been fully appreciated at the time. Some weeks later he was sent to a convalescent home, and while he was there the weakness increased and all tendon reflexes were lost. He was readmitted to hospital on November 2, 1941, after which weakness of the hands and arms developed. About this time a nasal swabbing was found to contain *Corynebacterium diphtheriae* and he was given 96,000 units of antitoxic serum, with a further injection of 48,000 units the next day. He had thus had a total of 252,000 units of diphtheria antitoxic serum during his illness. A severe allergic reaction followed the second series of injections, affecting especially the joints. An improvement of muscular power was manifest within a week, and thereafter was progressive. The tendon reflexes had returned in a fortnight and a few days later all superficial and deep reflexes were present. At the time of the meeting he was active and fit, apart from slight hypotonia and wasting of his left quadriceps femoris muscle. The use of massive serum therapy seemed to have been beneficial in his case.

Major Marshall went on to say that it was apparent that diphtheria was a real problem in the Middle East, at any rate so far as visiting troops were concerned. Evidently some of them were unduly susceptible to the toxins of local strains of *Corynebacterium diphtheriae*. The comparatively small series of cases dealt with at Number 6 Australian General Hospital in recent weeks had served to impress everyone with the serious possibilities of the disease and to indicate that at times they were not sufficiently appreciated by all concerned. While the disease was benign in most of the cases, its course had been disconcertingly complicated in a few others, despite the free use of antitoxic serum. Admittedly in some instances there had been delay in the giving of antitoxin, and perhaps dosages had been on a restricted basis, largely because of the necessity for economy. Recently, as the gravity of the disease became more obvious, increasing dosages of antitoxin had been employed. It was evident that the well-known principle of adequate early dosages of antitoxin could not be ignored. The extent of the local lesion and the severity of the toxæmia seemed to be essential criteria in the estimation of the dosage, and in that connexion McSweeney's classification of the disease into four grades was useful. So far no serious heart complications had occurred in the small series of cases at Number 6 Australian General Hospital—nothing beyond moderate tachycardia persisting for a week or so and subsiding with rest. Several patients had exhibited mild pareses, but in only two cases were they as severe and extensive as in the two cases described. In ten cases the persistence of *Corynebacterium diphtheriae* in throat swabbings had been a feature. The tonsils were unhealthy in the majority of these cases, and in all except two tonsillectomy was followed by the prompt return of "negative" reports. Of the remainder, one infection took four weeks to clear and the other seven weeks, the organism evidently dying out spontaneously. The problem of the persistence of diphtheria organisms in nasal swabbings also existed, as exemplified by two patients whose periods of residence in hospital for this reason already amounted to four and three months respectively. It was hoped that the subculturing of the organisms on tellurite medium and virulence tests on guinea-pigs would resolve the difficulty.<sup>1</sup>

Major Marshall then recapitulated certain views on the efficacy of antitoxic serum as propounded by R. A. Q. O'Meara in *The Lancet* of February 15, 1941. O'Meara considered that modern antitoxin was not so effective as the original product of about forty-five years earlier. Doubts

<sup>1</sup> Since the meeting these infections have cleared up spontaneously, during a spell of cold, windy weather followed by snow—a course of events which suggests that atmospheric conditions may be significant in this connexion.

that antitoxic serum was an absolute specific against diphtheria had often been expressed in recent years, and it seemed that current methods of preparation detracted from the effectiveness of the product. The use of a standard strain of organisms for producing toxin and the employment of precipitation and digestion processes in refining antitoxin were questionable. The results were high unitage in small bulk and a grave discrepancy between laboratory and clinical effectiveness. O'Meara's view that toxin contained two deleterious factors in proportion varying greatly with the strain of organisms involved appeared to be substantially correct, and the corollary that antitoxin must vary correspondingly in effectiveness seemed obvious. Evidently modern antitoxin was only partly effective in the "hypertoxic" diphtheria caused by the *gravis* and *intermedius* strains of organisms, since its neutralizing power against one of the elements of their toxins was low. Distinguishing those two toxic factors as "A" and "B", O'Meara sought to show that while commercial antitoxin would effectively neutralize toxins of high "A" and low "B" content, it failed when the reverse applied. Further, the avidity of antitoxin, or its ability to remain firmly united with toxin, was apparently related to its "anti-B" substance content, so that when that was low dissociation might occur and the toxæmia progress unabated. The avidity of antitoxin was also impaired when an excess reacted for a time with small amounts of toxin, so that even massive doses might be only temporarily effective. Clinical support for these views had been offered by C. J. McSweeney in an article appearing in the same number of *The Lancet*. He distinguished four clinical grades of the disease, in the milder two of which commercial antitoxin, given reasonably early, was highly effective. The other two—diffuse and hemorrhagic forms with gross local lesions, faucial oedema, "bull neck" and severe toxæmia—responded unsatisfactorily to ordinary antitoxin and were associated with a high mortality rate. In a limited series of such cases he had obtained extraordinarily good results with a special avid antitoxin, which, fortuitously produced, was as yet not available commercially.

In conclusion, Major Marshall suggested that the available types of antitoxic serum might be best employed in divided doses given frequently—for example, every four hours—so as to offset the loss of avidity to which the usual massive doses were exposed, thus ensuring the effective neutralization of toxin as it was formed. He further said that the more severe local manifestations of the disease were due to the organisms of diphtheria and not to secondary infections, and that the use of sulphonamide derivatives was therefore not advantageous.

MAJOR F. W. NIESCHE gave details of twelve cases of cutaneous diphtheria and described the technique of the treatment he had adopted. From observation of the patients under his care he described the appearance of a typical diphtheritic ulcer. An ulcer that had not been subjected to treatment had a dry, blackish, membranous and gangrenous slough with areas of redness and oedema surrounding it. Leathery in consistency, the slough was removed only with difficulty. When soaked for an hour or more under a saline pack or in a bath, it changed from a blackish hue to a greyish colour and looked exactly like a typical diphtheritic membrane in the mouth. When the slough was removed, an untreated ulcer showed certain indolent characteristics. The edges were red and heaped up and the base was hollowed out and as a rule fairly deep.

In Major Niesche's opinion the value of intramuscular injections of diphtheria antitoxin was that they promoted the separation of the slough or membrane. The local application of serum appeared to be valueless. The standardized treatment given to diphtheritic ulcers was immersion of the affected part of the body in 2% saline solution baths, or, if that was impracticable, the application of 2% saline solution packs for about one hour. Sulphanilamide powder was then applied to the consistency of a hoar-frost with the aid of a blower. By this method very little powder was used. Next a *tulle gras* dressing was applied and over it a saline pad was bandaged and moistened twice a day. The dressing was soaked off the following day in the saline bath and the treatment was repeated once a day. The dresser wore a mask over the nose and mouth while carrying out this procedure and was careful to use an aseptic technique. The difference in the appearance of the ulcers after twenty-four to forty-eight hours of this treatment was surprising. The bath aided the separation of the slough, and soon the edges of the ulcer became flattened and the base began to fill up. If any part of the treatment were interrupted the ulcer would become sluggish, even when the use of sulphanilamide powder was stopped, possibly because the majority of ulcers had a mixed infection. The saline baths appeared to stimulate the ulcers and the *tulle gras* dressings did not spoil any fresh epithelium. Although saline baths were superior to saline packs, the latter were a good substitute. The *tulle*

*gras* was a coarse net, impregnated with an ointment consisting of one part of balsam of Peru in 99 parts of "Vaseline" and then autoclaved. It was thought that the balsam of Peru, like the saline solution, stimulated the epithelial spread. Major Niesche considered that it was essential that the healed area be supported with a pad and a firm crepe bandage, especially if it were located in the lower extremity of a patient who had been long recumbent. When no support was given, the area frequently became blue or almost black, especially in cold weather, small petechial hemorrhages appeared and the area was apt to break down. That was noticeable in a partly healed ulcer. If the leg was allowed to hang down for any length of time, petechial hemorrhages formed and delayed further healing for some days. Limbs that behaved in that fashion should be at once elevated, and saline packs should be applied unless a total immersion bath was available. The treatment thus outlined was found to be satisfactory for all desert sores. There was some controversy as to whether patients suffering from cutaneous diphtheria should be isolated if the nose and throat swabbings were not found to contain diphtheria organisms. Unfortunately no virulence tests had been carried out in Major Niesche's series of cases, but the pathological reports, together with the clinical features, were taken as positive evidence of diphtheritic infection.

Major Niesche then demonstrated a table illustrating the details of his twelve cases (Table I). The first patient of the series had severe post-diphtheritic paralysis. He manifested difficulty in swallowing liquids, loss of taste, paresis of the right half of the tongue and of the soft palate, and interference with ocular accommodation. He had a normal blood count and his blood had failed to respond to the Wassermann test.

LIEUTENANT-COLONEL D. J. THOMAS, LIEUTENANT-COLONEL E. L. COOPER, MAJOR S. W. WILLIAMS and several others also took part in the discussion.

### Cerebral Abscesses.

LIEUTENANT-COLONEL T. Y. NELSON then discussed a case of cerebral abscesses occurring in a soldier, aged thirty-five years (see page 3).

COLONEL R. A. MONEY expressed his belief that the case was one of so-called *Spätapoplexie*. The alleged trauma to the soldier's head some two weeks prior to the onset of his symptoms had possibly produced an area of contusion with thrombosis and softening, into which a hemorrhage had subsequently occurred. Still later infection of the hematoma had taken place. This would explain the brownish appearance of the initial discharge and the presence of the foul odour due to the *Bacillus coli communis*, which Colonel Money had never previously encountered in a cerebral abscess. The pus from the second abscess was quite different, being thick, yellow and odourless. It was not present at the time of the first operation. Its discovery with such a thickened capsule was a complete surprise, and he was at a loss to explain its formation.

DR. FEIGENBAUM, ophthalmologist to the Mayer de Rothschild Hadassah University Hospital, Jerusalem, said that the idea that trauma was the causal factor appealed to him in this case. He also discussed other aspects of brain abscesses and tumours, with special reference to papilloedema and defects of fields of vision.

COLONEL R. A. MONEY described a case of cerebral abscess due to pulmonary suppuration (see page 5).

### Mid-Carpal Fracture-Dislocation.

MAJOR E. F. WEST showed two patients with mid-carpal fracture-dislocations, recently treated by him at the hospital. The first lesion was an example of the common variety of posterior dislocation of the distal row of the carpus, carrying with it the fractured distal half of the scaphoid. The cuneiform was also fractured. The dislocation was easily reduced by traction and flexion, and the wrist was immobilized in plaster in a position of slight palmar flexion. The soldier had associated crush fractures of the lumbar vertebrae. There was no difficulty in the treatment of this patient.

The second patient showed the reverse deformity. The head of the *os magnum* was displaced forward out of the lunate socket, the anterior beak of which was fractured. The scaphoid was fractured through the waist and the distal fragment, together with the *os magnum* and other bones of the distal row had been displaced forward. Associated with this was a compound dislocation of the heads of the third, fourth and fifth metacarpal bones

<sup>1</sup> Colonel N. H. Fairley states that more detailed bacteriological investigation in the Middle East showed that more than 10% of the diphtheria-like organisms isolated from desert sores were virulent to guinea-pigs.



TABLE I.

Area Affected.	Duration Prior to Treatment.	Units of Serum.		Time Taken for Healing.	Swabbings.	
		Given Intramuscularly.	Local.		Nose and Throat.	Ulcer.
(a) Foot .. .. } (b) Ankle .. .. }	5 weeks.	64,000	Nil.	(a) 8 weeks. (b) 26 days.	—	—
Forearm, insect bite indolent	7½ weeks. Treated at first with acriflavine and paraffin.	24,000	24,000	14 days first time. 10 days later bleb developed. 25 days.	—	+ Klebs-Löffler bacillus.
Right ankle .. .. Right index finger ..	4 weeks 2 days. Indolent.	8,000	Ankle: 8,000 Finger: 8,000	Foot: 25 days. Finger: 12 days.	—	Ankle: +. Finger: —.
Septic sore right leg, skin grafted at another hospital	Shin: 14 weeks. Donor area: 6 weeks	24,000	24,000 Donor area prior to treatment.	Donor area: 40 days. Shin.	—	Donor area: + Klebs-Löffler bacillus.
Ulcer nail bed great toe following operation at a casualty clearing station.	9½ weeks.	—	16,000 prior to treatment.	15 days.	—	+ Klebs-Löffler bacillus.
Dorsum right hand ..	17 days and still extending.	64,000	—	38 days.	—	+ Klebs-Löffler bacillus.
Gunshot wound right hand. Wound infection with Klebs-Löffler bacillus.	7½ weeks.	64,000	—	13 days.	—	+ Klebs-Löffler bacillus.
Ulcer left leg indolent ..	11 weeks.	16,000	—	20 days.	—	+ Klebs-Löffler bacillus.
Right foot, deep ulcer between fourth and fifth toes indolent.	4 weeks.	32,000	—	14 days.	—	+ Klebs-Löffler bacillus.
Calf left leg, two ulcers, insect bite.	5 weeks indolent.	96,000	—	(a) 13 days. (b) 27 days.	+ Klebs-Löffler bacillus.	+ Klebs-Löffler bacillus.
Ulcer over medial malleolus right ankle.	5 months.	46,000	—	30 days.	—	+ Klebs-Löffler bacillus.
Ulcer left shin .. ..	6 weeks.	72,000	—	8 days.	+ Klebs-Löffler bacillus.	+ Klebs-Löffler bacillus.

through a wound in the palm. Other associated injuries were fractures of the patella and olecranon. Treatment of the wrist injury presented some interesting problems. Reduction was easily carried out by bringing the hand into the position of dorsiflexion. The head of the *os magnum* returned into the lunate socket, but reduction of the scaphoid fracture was not quite complete. The wrist was immobilized in this position of dorsiflexion. Check radiographs taken ten days later showed the head of the *os magnum* to be slipping forward, the crushing of the anterior beak of the semilunar socket allowing this to take place. Under anaesthesia traction was applied and the hand was brought into slight palmar flexion. The head of the *os magnum* returned into the semilunar socket, but in that flexed position the distal scaphoid fragment was still displaced proximally and forward. Continuous traction might have sustained and improved the position, but could not be carried out on account of the wound of the palm. Some four weeks later, when the palmar wound had healed, the scaphoid was exposed through an incision in the "anatomical snuff box" and the distal fragment was gently levered back into position with minimal dissection. With the hand in dorsiflexion skiagrams showed that a complete reduction of the scaphoid fragment and head of the *os magnum* had taken place.

Major West remarked that the second case illustrated an uncommon form of trans-scapho-perilunar dislocation, the reverse (forward) of the usual (backward) displacement having taken place. Additional difficulty in treatment resulted from the fact that the fracture of the anterior beak of the lunate socket made reduction unstable in what was the optimum position (dorsiflexion) for reduction of the scaphoid fracture. The prognosis depended on the viability of the scaphoid fragment. If much damage had been done to the blood supply, avascular necrosis might supervene, with resultant arthritis from absorption of cartilage. Care was taken in the process of open reduction not to strip off ligamentous connexions and thereby do further damage to the blood supply.

#### Foreign Body in a Shoulder Joint.

Major West also showed a patient with a foreign body in a shoulder joint. The patient was a soldier, aged twenty-four years, who had been wounded by a mortar bomb on March 25, 1941. A metallic fragment had entered the right shoulder region anteriorly and had been retained. Following this he had pain on certain movements of the shoulder. He complained that the shoulder would "catch" in certain positions, although when it was dependent he could use the arm quite well. He had been admitted to the hospital in

November, 1941. Skiagrams showed the shadow of a small metallic foreign body in the region of the right shoulder joint. Major K. B. Voss had been able to demonstrate conclusively by X-ray films taken in different positions and by fluoroscopy that the foreign body was intra-articular and could be made to move about in the shoulder joint. No bone damage was present. Four weeks prior to the date of the meeting the shoulder joint was opened through an anterior approach and a metallic foreign body, the size of a pea, was found free in the joint and was removed. No damage to the articular cartilage was observed. The soldier had made an uninterrupted recovery and now had full and painless movement. Interesting features of the case were the entry of a metallic foreign body into the interior of the shoulder joint without damage to bone or cartilage, the relatively mild symptoms caused by its presence, and, lastly, the accurate localization of the foreign body within the joint by radiographic means.

#### Pulmonary Actinomycosis.

MAJOR M. T. COCKBURN gave the clinical and post-mortem details of a case of pulmonary actinomycosis (see page 7).

### Correspondence.

#### NEURO-SURGERY IN AUSTRALIA.

SIR: Your issue of February 21, 1942, only arrived a few days ago. The sentiments and ideals expressed in Professor Dew's Halford Oration on "The Ancillary Sciences and Neuro-Surgery" and your leading article on "Neuro-Surgery in Australia" are heartily endorsed. But I would like to draw attention, through your columns, to some omissions from your leader concerning the development and present state of neuro-surgery in Sydney and the establishment and work of the neuro-surgical unit at the Royal Prince Alfred Hospital, in connexion with which only the names of Professor Dew and Dr. Gilbert Phillips were mentioned.

Although surgically inclined from student days, something more than the attainments of a skilful craftsman was aspired to, and in neuro-surgery it was felt that the opportunities for combining the art of surgery with the science of medicine, and particularly neurology, existed. About 1927 the time appeared to be ripening for the establishment of a neuro-surgical clinic in Sydney, more especially as a colleague, Dr. Eric Susman, had already joined the staff as an assistant physician, particularly qualified in neurology. The opportunity of furthering this ideal presented itself in the second half of 1928, when, following a visit to the annual meeting of the American College of Surgeons with the present chairman of the Hospital, Dr. H. H. Schlink, I was able to attend the clinics and learn the methods of the late Professor Harvey Cushing at Boston, Professor Howard Naffziger at San Francisco, and most of the leading neurosurgeons of North America and Great Britain.

Full of enthusiasm, and with my own armamentarium I returned in June, 1929, to advocate and illustrate the scope of this branch of surgery and its methods, but, being a very junior assistant surgeon, I was, like Saint John the Baptist, "a voice crying in the wilderness". Not only was little help afforded my early efforts, but active opposition was placed in their way by the passing of a rule that only senior honorary medical officers could be asked to see patients in consultation! Thus was ready access to likely neuro-surgical material in the public hospital barred for some years, until, with the establishment of the Surgical Professorial Unit in July, 1931, and the advent of Professor Dew, the way was opened.

He enjoyed at once the full rights of a senior honorary surgeon and, with the influence of the professorial chair and his own interest in the subject behind him, set out to put neuro-surgery on a workable basis. Fired, as he always had been, with commendable zeal and the attributes of a true post-graduate teacher, he placed the facilities of his unit and his own personal knowledge at the disposal of his first assistant surgeon, Dr. Richard Flynn, for two years, during which time I went abroad again and attended the clinic of Mr. (now Professor) Hugh Cairns in London. From July, 1933, to July, 1935, I was the assistant surgeon to the professorial unit, and carried out practically all the neuro-surgical work at the hospital in the general wards and theatres, with Professor Dew's help and guidance, but under the greatest difficulties, for lack of suitable facilities. Shortly afterwards, Professor Dew arranged for me to work at Professor Naffziger's clinic in San Francisco from November, 1935, till March, 1936.

About this time, as the result of a request from Professor Dew and the Medical Board, the chairman of the hospital suggested, and the board of directors agreed to, the establishment of a department of neuro-surgery (with the financial aid of the New South Wales Government) in a special floor on top of the proposed psychiatry building, for which funds and plans were already available. The professor of surgery was appointed director of this new department, and early in 1937 applications were called for two honorary assistant neuro-surgeons. I was appointed to one of these positions, but continued on the staff as an assistant surgeon until the building was actually completed and opened in March, 1938. During this interval I assisted in the preparation of the layout and plans of the neuro-surgical department and designed the specially modified operating table and other equipment to be used in it.

Being the senior assistant neuro-surgeon, I had charge of the department during Professor Dew's absence for nearly twelve months in 1939, and the statistics of the work done during that period can be readily obtained from the annual reports of the hospital. Shortly after his return, instead of transferring to the Reserve of Officers, I volunteered for service abroad with the Australian Imperial Force and was brought back from the Unattached List, to command a general hospital in July, 1940. I proceeded overseas in December, 1940, thus interrupting a professional career for the second time in twenty-five years.

Additional evidence of my activities in furthering the practice of neuro-surgery can be obtained from several articles and case reports already published or awaiting publication in your journal or in *The Australian and New Zealand Journal of Surgery*, either alone or in collaboration with colleagues qualified in neurology.

In discussing the development of neuro-surgery in Sydney, the name of Dr. (now Major) Douglas Miller was also omitted. He pioneered this class of surgery and established a clinic at Saint Vincent's Hospital, after spending nearly a year in 1934 under Mr. (now Professor) Hugh Cairns at the London Hospital. Recently whilst abroad with an Australian general hospital he was temporarily detached to a neuro-surgical unit at a British general hospital during the second Libyan desert campaign. Finally, no mention was made of Dr. (now Lieutenant-Colonel) T. Y. Nelson, who was responsible for the neuro-surgical work at the Royal Alexandra Hospital for Children from 1934 until he proceeded overseas with an Australian general hospital in January, 1940, and who during 1940 did all the neuro-surgical work for the Australian forces in Palestine.

Truly have you stated that the work of neuro-surgery is exacting. It is both back-breaking and heart-breaking. That some of those who devote their energies to it should not receive the recognition you state they deserve, owing to the truth of the old adage "Out of sight, out of mind", is not likely to provide the encouragement they need to continue.

Yours, etc.,

R. A. MONEY,  
Colonel,

Commanding Sixth Australian  
General Hospital.

May 18, 1942.

#### JOURNALS WANTED.

SIR: In order to complete our series of medical journals in the library of the Medical School of the University of Queensland, we are anxious to obtain various odd numbers of journals, a list of which is attached hereto.

Should any readers of THE MEDICAL JOURNAL OF AUSTRALIA possess any of these numbers, we should be most grateful if you could ask them to let us know if they would be willing to make them available to us. We could then arrange to receive the journals.

Yours, etc.,

E. S. MEYERS,

Dean of the Faculty of Medicine.

June 11, 1942.

*British Medical Journal*: 1885, Volume I; 1923-1929; 1933-1935.

*The Lancet*: 1876, Volume I; 1885, Volume I; 1897, Volume I; 1901, Volume I; 1927, Volume II; 1932, Volume II; 1937, Volume II.

"Medical Annual": 1903.

*The British Journal of Surgery*: Volume I, Number 2 (October, 1913); Volume VII, Number 31 (January, 1921); Volume XIX, Numbers 73, 75 (July, 1931, January, 1932); Volume XX, Numbers 77, 80 (July, 1932, April 1933); Volume XXI, Numbers 81, 82 (July, October, 1933); Volume XXII, Number 86 (October, 1934); Volume XXIII, Number 90 (October, 1935).

*Surgery, Gynecology and Obstetrics*: 1902-1907, Volumes 1-VI; 1913, Volume XVII, Numbers 2-6 (August-December); 1914, Volume XVIII, Numbers 2-6 (February-June); 1914, Volume XIX, Numbers 1-6 (July-December); 1915, Volume XXII, Numbers 1-6 (July, December); 1916, Volume XXII, Numbers 2, 3, 4, 6 (February, March, April, June); 1916-1920, Volumes 23-31; 1931, Volume LII, Number 5 (May); 1933, Volume LVII, Numbers 3, 4 (September, October); 1935, Volume LX, Number 3 (March); 1936, Volume LXII, Number 5 (May); 1936, Volume LXIII, Number 1 (July).

## Australian Medical Board Proceedings.

### NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Practitioners Act*, 1938-1939, of New South Wales, as duly qualified medical practitioners:

Aikin, Margaret Wilkinson, M.B., B.S., 1931 (Univ. London), 48, Darnley Street, Gordon.  
Robinson, Ethel Lillian, M.B., B.S., 1932 (Univ. Melbourne), Small Arms Factory, Bathurst.  
Gorman, John Laurence, M.B., B.S., 1936 (Univ. Melbourne), Small Arms Factory, Lithgow.  
Snodgrass, Robert Jackson, L.R.C.P., L.R.C.S., 1926 (Edinburgh), L. 1926, F. 1939, R.F.P.S. (Glasgow), Bank of New South Wales, Mosman.  
Gild, David Hillston, M.B., B.S., 1938 (Univ. Adelaide).  
Zimmet, Jacob, M.B., B.S., 1942 (Univ. Adelaide), 44, Second Avenue, Saint Peters, South Australia.  
Burton, Phillis, M.B., B.S., 1923 (Univ. Durham), Alan Avenue, Seaforth.  
McKay, Ronald George MacAlpine, M.B., B.S., 1941 (Univ. Adelaide), 32, Gardener's Road, Mascot.

The following additional qualifications have been registered:

Cuthbert, Grace Johnston (M.B., Ch.M., 1924, Univ. Sydney), M.R.C.O.G., 1939, Department of Public Health, Sydney.  
Trahair, Geoffrey (M.B., B.S., 1933, Univ. Melbourne), D.P.M., 1940 (Univ. Sydney), Mental Hospital, Gladsville.

## Obituary.

### DAVID TRUMPY.

We regret to announce the death of Dr. David Trumpy, which occurred on June 22, 1942, at Warragul, Victoria.

## Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Owen, Morris David, M.B., B.S., 1940 (Univ. Sydney), Newcastle Hospital, Newcastle.

## Medical Appointments.

The undermentioned have been appointed Public Vaccinators in the Department of Public Health, Victoria: Dr. Albert Lewis Julius Peters, Dr. Selwyn Bligh Sutton, Dr. Erskine Christian Faragher, Dr. Herbert Berkeley Deane Vaughan, Dr. William Anselm Collopy and Dr. Ralph Whitburn Nicholls.

Dr. Alan Leslie Langley has been appointed Government Medical Officer at Delegate, New South Wales.

The undermentioned have been appointed Members of the Nurses' Board of South Australia, under the provisions of the *Nurses Registration Act*, 1920-1934: Dr. Lewis Wilmer Jeffries (Chairman), Dr. Laurence Algernon Wilson and Dr. Keith McEwin.

Dr. Stephen Graham Sandes has been appointed a Medical Officer in the Department of Public Health, New South Wales, from March 1, 1942.

## Books Received.

"First Aid and the Medical Practitioner", by various authors, with an introduction by E. Rock Carling, M.B., B.S., F.R.C.S.; edited by Sir Humphry Rolleston, Bt., G.C.V.O., K.C.B., M.D., F.R.C.P., and Alan Moncrieff, M.D., F.R.C.P.; 1942. London: Eyre and Spottiswoode. Medium 8vo, pp. 108 with 9 illustrations. Price: 6s. net.

## Diary for the Month.

JULY 7.—New South Wales Branch, B.M.A.: Council Quarterly.  
JULY 10.—Queensland Branch, B.M.A.: Council.  
JULY 14.—New South Wales Branch, B.M.A.: Executive and Finance Committee, Organization and Science Committee.  
JULY 14.—Tasmanian Branch, B.M.A.: Branch.  
JULY 15.—Western Australian Branch, B.M.A.: Branch.  
JULY 21.—New South Wales Branch, B.M.A.: Ethics Committee.  
JULY 23.—New South Wales Branch, B.M.A.: Clinical Meeting.  
JULY 24.—Queensland Branch, B.M.A.: Council.  
JULY 28.—New South Wales Branch, B.M.A.: Medical Politics Committee.  
JULY 30.—New South Wales Branch, B.M.A.: Branch.  
JULY 30.—South Australian Branch, B.M.A.: Branch.  
JULY 31.—Tasmanian Branch, B.M.A.: Council.

## Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

**New South Wales Branch** (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

**Victorian Branch** (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

**Queensland Branch** (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

**South Australian Branch** (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

**Western Australian Branch** (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

## Editorial Notices.

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